NSF predicts 1987 shortage of analysts, programmers

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The nation could be faced with a shortage of systems analysts and programmers, amounting to 115,000 to 140,000 workers in 1987, according to a National Science Foundation report featuring projections based on econometric models.
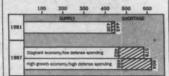
The report, which was released recently, said projections for 1987 indicated it would take a 25% to 30% increase in the supply of these computer specialists to meet the demand, depending on the pace of the economy and defense spending. (A labor shortage exists when the projected demand exceeds the supply of newly graduated people in a field by at least 5%, the report said.)

The foundation published projections on labor supply and demand for a variety of scientific and technical fields. The study's overall conclusion was that strong growth in demand will create problems

Computer Systems Analysts/Programmers Supply and Demand, 1987 Projections (thousands)

CW chart from National Science Foundation data

concerning three groups of professionals: computer specialists, who have been in short supply over the past decade, and aeronautical and electrical engineers, who will be in demand because of increases in defense spending.

By 1987, the foundation report said, the majority of science employees will be concentrated in three occupations: computer systems analysis, psychology and

See **JOBS** page 4

Beating telecom tariffs: The rules have changed, but the game goes on

By John Dix
CW Staff

The incentive to use rusty switches is gone, squeezed out like many of the other tricks of the telecommunications manager's trade. But in the new environment, users can still pull a few cards out of their sleeves to minimize network expenses.

"Rusty switch" is a figurative term for a scheme once used to take advantage of the disparity between intra- and interstate private-line rates. Companies that operated networks within a state, for example, could drop a line across a neighboring border and claim they had an interstate network. The lower interstate rates could then be adopted for the whole network and could result in savings as high as 30%.

The use of rusty switches — an example of just one network optimization technique — has fallen by the wayside, initially a victim of rising interstate private-line rates and then of the AT&T divestiture.

Before the breakup, AT&T turned a blind eye to rusty switches, "because it all went into the same revenue pool," according to Alan Pearce, president of Information Age Economics, a Washington, D.C.-based consulting company. Now the boundaries are drawn, and AT&T and the divested Bell operating companies jealously guard their revenues.

But splitting up AT&T did more than put the finishing nails in the coffin of rusty switches. It fundamentally changed

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NEWSPAPER

TOP OF THE NEWS

A **General Accounting Office report blasted** the Social Security Administration's handling of a $115 million communications contract with Paradyne Corp. **Page 2.**

Symphony left him a bit flat. A beta test user of Lotus Development Corp.'s integrated software said the package doesn't integrate data easily. Also, analysts compared Symphony with Framework, Ashton-Tate's integrated product. **Page 6.**

The bulls ran wild on Wall Street in recent weeks, testing the limits of the computer resources of the New York Stock Exchange and illustrating the critical need for capacity planning. **Page 8.**

Washington perspective. Dr. Ruth M. Davis amassed a slew of credentials and awards in a long and impressive career in government DP-related work. She reflected on her experiences and on the evolutionary changes in computing during a *Computerworld* interview. **Page 17.**

Topping its line of 16-bit minicomputers, MDS Qantel, Inc. unveiled its System 264. The firm said the machine offers twice the internal throughput of Qantel's older model, the System 64. **Page 81.**

For retail exec, DP led to success

"The modern age has a false sense of security because of the great mass of data at its disposal. But the valid criterion of distinction is rather the extent to which man knows how to form and master the material at his command."
— Johann Wolfgang Von Goethe, 1832.

By Kathleen Sullivan
CW West Coast Bureau

LOS ANGELES — This framed quotation, penned by a calligrapher, hangs on the wall behind James E. Gray's desk. Just beneath it sits a computer terminal, blinking out the "Daily Flash Sales Report" in bright green letters. Gray, 45, is the executive vice-president of Bullock's, whose corporate headquarters sits squarely on a corner of downtown Los Angeles in a mirrored building.

It could be a motto of sorts for Gray, whose career path has taken him from the computer room to the executive suite of this California-based department store chain. Gray said he appreciates the timelessness of the German dramatist's words, set down more than 150 years ago.

Gray has found that his ability to form and master data, gleaned from his days in the data processing department, has served him well in his new role as executive vice-president.

"I know there are systems solutions to many problems, and I know that I can change things," he said. "Other executives think they have to live with problems or beat up a person to solve it. Someone with DP experience asks: 'Is there a systems solution?'"

Gray posed that question a few years ago about Bullock's method of handling purchase orders, when he realized that the firm was buried in accounts payable paperwork. So he wrote an on-line purchase order management system. "I botched it up terribly," he confided with a self-effacing laugh, "but it was the right thing to do." Eventually, the system's wrinkles were smoothed out, he added.

More than 20 years ago, when Gray was contemplating his career choices, he did not even consider data processing. When he graduated from the University of Texas with a degree in general business, he had his sights set on a job as a merchant — a buyer for a department store chain.

After a brief stint with a Texas clothing store, he moved to Los Angeles and began work in the cosmetics department of Bullock's.

In 1962, Bullock's decided to establish an internal data processing center and tapped Gray and four other employees for the task.

"At the time, I didn't know what data processing was," Gray remembered with a laugh. The five were sent for training to NCR Corp., which was providing Bull-

See **GRAY** page 7

NEWS

Trilogy Systems discontinues chip-making

CUPERTINO, Calif. — Trilogy Systems Corp., which in June [CW, June 18] announced it had cancelled attempts to develop a large-scale IBM-compatible computer, said last week it was suspending development of the wafer-scale integration semiconductors around which the computers were to be designed.

The company said it will instead extend its high-performance circuit, packaging and interconnect technologies to accommodate conventional semiconductors.

As a result, the company discontinued its semiconductor manufacturing operations here and cut its 460 person work force by half, a spokesman said.

The company said it would seek a tenant to occupy the facility and was in the process of finalizing plans for an undisclosed firm to use its production facility in Ireland.

Co-founder and chairman Gene Amdahl said, "Our decision to close the manufacturing facility and to modify our technology program reflects the necessity to conserve our resources to maximize the likelihood of successful commercialization of the circuit development, packaging and interconnect aspects of Trilogy's technology."

The latest announcements also would seem to doom Amdahl's recently stated goals to develop a small processor based on wafer-scale technology (see page 112).

However, Amdahl said last week, the company still was studying a number of applications of its circuit development technology, including its use in medium- and high-performance computer systems "with a goal of finalizing our development plans by the end of next month."

He also said the company is continuing discussions with sharehold licensees of the technology regarding possible modifications of existing arrangements. Digital Equipment Corp., Sperry Corp. and CII-Honeywell Bull invested a total of about $80 million in the company.

Based on Amdahl's reputation as a key member of the IBM 370 architecture design team, and his early success in founding Amdahl Corp. as an IBM plug-compatible manufacturer, Amdahl had been able to raise more than $230 million from a variety of sources.

CORRECTIONS

Digital Equipment Corp. has begun commercial shipments of its new Micro PDP-11/73 system now, rather than in September as was mistakenly reported [CW, July 23].

The photos accompanying "RTI founder sees relational DBMS gaining user approval" and "Oracle president enjoying relational DBMS' popularity" [CW, Aug. 6] were inadvertently reversed.

First-quarter revenues of BGS Systems, Inc. were incorrectly reported in the Nickels & Dimes column of the July 30 edition. Revenues for the quarter were $2.2 million, up $701,658 from the previous year.

GAO slams Paradyne's SSA system work

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — A General Accounting Office (GAO) report blasted a $115 million communications modernization contract awarded by the Social Security Administration (SSA), claiming the system has "serious flaws" and charging SSA officials with poor management.

The GAO recommended the entire modernization program be reviewed and the contract with Paradyne Corp. be terminated. The contract is the subject of a suit filed against Paradyne by the Securities and Exchange Commission, as well as the subject of numerous other governmental investigations [CW, April 4, 1983].

Since the initial installation of Paradyne's data communications terminals in June 1981, the SSA has negotiated lower performance standards and loosened internal controls over the administration of the contract, GAO charged. The Paradyne contract called for intelligent user-programmable terminals to be installed in the 1,350 regional SSA offices.

Requirements changed

The report asserted that the performance requirements of the terminals were changed after repeated failures in acceptance tests of the terminals.

In response to the charges, Paradyne's chief executive officer, Robert Wiggins, said his company had been denied a chance to defend itself at the hearing. He labeled the attacks against Paradyne "without foundation or substance" and said his company has "been caught up in a night-mare, consisting of a variety of attacks, adverse rumor, innuendo and charges." Wiggins asserted that an independent report by the Mitre Corp. shows that Paradyne's system is working well.

However, the GAO report claimed it took two years for Paradyne's equipment to meet contract performance requirements. "As a result of

> *'The Paradyne equipment provides no appreciable increase in processing capability over the system it replaced.'* — The U.S. General Accounting Office

the SSA's procurement activities with Paradyne Corp., the agency acquired a data communications system that, according to SSA analysis, did not begin to meet contractual system availability requirements on a consistent basis until April 1983 — more than two years after the contract award," the report maintained.

The report said that because SSA decided not to require the contract's provision for enhancement of the terminals to enable them to perform local programming for upload to a host computer, "the Paradyne equipment provides no appreciable increase in processing capability over the system it replaced."

SSA officials appearing at the recent congressional hearing where the GAO report was presented were lambasted by Rep. Jack Brooks (D-Texas), chairman of the Government Operations Committee. Brooks called a two-year investigation into the contract by the committee a "story that . . . paints a picture of a critical computer project which has been undermined by potential fraud, deception and official misconduct."

SSA Deputy Commissioner Marshall Mandell acknowledged the weakness of internal controls existing over the administration of the Paradyne contract. However, Mandell said that Paradyne was honoring the terms of its contract by having the terminals available 98% of the time for SSA operations.

John Wicklein, SSA associate commissioner for system operations, testified that despite initial subpar performance by Paradyne and continuing operational problems with the terminals, SSA employees are happy with the system's performance.

SSA officials acknowledged that equipment downtimes are not counted if Paradyne services and restores operation within a seven-hour period. However, SSA is seeking a credit of $150,000 from Paradyne because the malfunctions violate the contract.

The terminals supplied to SSA are Paradyne's P-8400 system, based on a Zilog, Inc. 8000 processor and a modification of Microsoft Corp.'s Xenix operating system.

Other components of the integrated system are Mannesmann Tally Corp. printers, C. Itoh Electronics, Inc./Toshiba America, Inc. floppy disk drives and a processor/controller manufactured by Paradyne.

NEWS SUMMARY

U.S. financial institutions will soon be using electronic, rather than paper, interbank payment transfers/**5**

Lotus Development Corp.'s Symphony received a lukewarm endorsement from a beta site user/**6**

The New York Stock Exchange's record trading day went almost without incident, thanks to capacity planning that anticipated trading volumes/**8**

CW at AAAI-84: A variety of product announcements indicated the increasing market orientation of artificial intelligence technology . . . AI experts are divided on the topic of how AI will fare in the world of traditional DP . . . Systems vendors see AI as a stage in the evolution of computer technology, but are preparing to meet user demand . . . Natural language processing systems are beginning to reach their market potential, one speaker said . . . Conference visitors had varied views on what constitutes AI/**12-16**

CW interviews Dr. Ruth M. Davis: Dr. Davis talks about computing, government and her role in each/**17**

An unpleasant surprise befell an adventurous sports fan who tried to outwit the Los Angeles Olympics' high-tech security system/**18**

A survey found MIS personnel are most often assigned to supervise company committees charged with recommending micros, developing nets and updating systems/**20**

Nevada is computerizing its court system and linking it with a central data base to provide judges with up-to-date criminal records/**21**

Working conditions, not VDTs, are the likely cause of many work-related medical problems, according to a Data Entry Management Association study/**24**

The jury is still out on the reasons why the computerized jury selection process for one Massachusetts county summoned a disproportionate number of jurors from one community/**26**

The first user of a new factory automation software package is using it to monitor production at another firm's plant/**28**

Employers are turning to a hitherto neglected pool of programming talent — the handicapped — as more and more disabled people attempt to enter the work force/**32-34**

A home health care firm's recently expanded system is handling bookkeeping and work-related employee data/**35**

A cooperatively owned grocery store chain sought out an integrated package to help with developing and maintaining systems for its client stores/**36**

Nabisco Brands, Inc. went from paper tape to electronic mail and saved 20% of its messaging operating costs/**37**

A Buffalo, N.Y., service bureau relies on a utility program generator for everything from report generation to code conversion/**38**

A national fast-food chain's director of systems development went shopping for software to allow communication between CICS command-level Cobol and DMS/**39**

NEWS

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chemistry. Projected employment for computer systems analysts is expected to increase by 5.6% to 6.7% a year, a rate almost three times as rapid as those in other major scientific fields, opening an additional 70,000 to 85,000 jobs.

"Although it was not until the 1970 decennial census that this job category [systems analysts] became sufficiently large to become a part of data collection efforts, by 1987 the projection scenarios estimate that 290,000 to 305,000 people will be required to perform this job function," the report said.

Altogether, roughly half of the systems analysts will be employed in business services (25%); finance, insurance and real estate (12%); and the wholesale and retail trade industries (12%). However, the growth of this labor market will be spread throughout many industries, the report said, due to the decreasing costs, reductions in size and expanding applications of computers for business.

In the labor category of technicians, computer programming is projected to be one of the fastest growing occupations, representing more than one-sixth of the technical work force by 1987, the report said. In that year alone, the foundation's projections indicated, a total of 290,000 to 300,000 programmers will be needed.

The growth in demand for computer programmers is projected to range from 4.3% to 5% per year, opening up an additional 55,000 to 65,000 jobs. Nearly half of this growth will be generated by business and service industries, particularly research laboratories and computer service bureaus; the rest of the additional programmers will be needed in the manufacturing sector, the report said.

Combining the projected requirements for systems analysts and programmers in 1987, the report estimated that 578,000 to 604,000 computer specialists will be needed then. However, supply projections showed that only 462,000 to 466,000 qualified computer specialists will be forthcoming from schools and from immigration.

Due to this projected shortage, a massive infusion of workers from other occupations may be needed to fill the gap, the report said. However, it warned that complex computer applications increasingly require people with strong science educations and graduate degrees and said, "Continued high transfer rates from other occupations may be difficult to sustain."

Projections in the report were derived from Data Resources, Inc. economic simulation models and a science and engineering labor supply model sponsored by the foundation. The report, "Projected Response of the Science, Engineering and Technical Labor Market to Defense and Nondefense Needs" (NSF 84-304), is available at no charge from the National Science Foundation, 1800 G St. N.W., Washington, D.C. 20550.

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the rules of the game.

The new rules are sufficiently complicated that, when combined with other divestiture side effects like order backlogs, users have become strapped with their day-to-day jobs and cannot get around to cost-cutting tricks, or what one consultant called the "shorter strokes."

"You're doing [well] if you can just figure out how to get service today," exclaimed Joseph T. Massey, president of JTM Associates, Inc., a consulting firm based in Atlanta.

While some new networking tricks have been developed, there is always the danger in this transitory period, where some tariffs remain up in the air, that by the time anything is implemented, rates will have changed. "The basic difficulty is that the people in Washington are changing the rules at the drop of a hat, with no rhyme or reason," noted Lee Goeller, president of Communication Resources, a consulting company in Haddonfield, N.J. "There are various things you can do in any given time and place, but almost invariably, holes are being plugged as rapidly as possible," Goeller said.

As it stands now, the new game in town, according to Charles G. Abbott, president of a telecommunications consulting company of the same name in New York, is "focusing on the differences between intra- and inter-Lata [Local Access and Transport Area] tariffs."

Latas are the boundaries created after divestiture to define the jurisdictions of the various telephone operating companies. Basically, the local telephone operating companies carry traffic within their Latas, and AT&T and the other long-distance carriers offer services between Latas. Some states have many Latas, while other less populated states may only have one. The 22 divested Bell operating companies have been divided into more than 160 Latas.

The creation of Latas, and the establishment of different rates for circuits within and between Latas, has yielded the 1980s' equivalent of the rusty switch, according to Dixon Doll, president of the DMW Group, Inc., a consulting firm based in Ann Arbor, Mich. In many instances, inter-Lata rates are more expensive than intra-Lata rates.

Given this, when optimizing networks for cost, the idea is to keep circuits from running over into adjoining Latas — to keep them "Lata-pure," in the words of Edward T. Garner, executive vice-president of the Aries Group, a network design firm in Rockville, Md.

A circuit that crosses a Lata boundary is said to be contaminated. One thing users can do, Doll said, is "run circuits within Latas to a concentrator or a hub and then only pay the inter-Lata pricing for connections between the hubs."

Given the size and complexity of many networks, implementing this simple recommendation could be a ferocious task. As Lee L. Selwyn, president of Economics and Technology, Inc., a telecommunications publishing and consulting firm in Boston, said: "The single biggest problem, given the multitude of tariffs under which a circuit may exist — depending on where it's going and how many operating companies are involved and whether it's contaminated — is being able to put this all together in one place so you can at least look at it."

Donald Dittberner, president of Dittberner Associates, Inc., in Bethesda, Md., concurred. "Frankly, tariffs vary so much from state to state, from specific situation to specific situation, that I'm not sure you can identify those [cost-cutting tricks]."

Offering the same caveat, Doll said that his group has discovered a lot of quirks in some of the proposed tariffs that make it advisable to find ways to get inter-Lata tariffs as intra-Lata services whenever possible.

One of the ways some large users are hoping to skirt the whole issue is by trying to convince long-distance carriers to make their premises a point of presence with their Lata, Doll said. All long-distance carriers maintain these so-called points of presence, or points of interface, in various Latas. AT&T operates the most. By housing a point of presence, a user cuts the local telephone company out as a middleman.

Selwyn summed it up by saying, "It's not as easy as it used to be, and people are going to have to get used to living in a more complex world. That isn't to say they're going to have more choices; it's just going to be more complex."

NEWS

Private-sector clearinghouse set to compete with Fed

WASHINGTON, D.C. — The 30 regional automated clearinghouses (ACH) performing interbank payment functions across the country are gearing up to link into a private-sector electronic payments system. This system is intended to provide cradle-to-grave electronic handling of deposits at competitive market prices.

The regional ACH's sole dependence on the Federal Reserve System for the interbank payments system has been, in recent years, the subject of a spirited contest between the American Bankers Association (ABA) and the Federal Reserve, the country's central banker.

The Fed has argued for an oversight role in monitoring the movement of money, while the ABA, led by its affiliate, the National Automated Clearing House Association (Nacha), has argued the need for competitive pricing of automated services as an option for banks.

Congress passed the Monetary Control Act in 1980, ordering the Fed to permit competition in the handling of electronic funds transfers (EFT) between banks.

Four years later, the private-sector alternative is at hand for banks. Nacha has selected General Electric Information Services Co. (Geisco) to provide the electronic payments settlement for banks.

Geisco and the regional ACHs are currently finalizing the development of an EFT system that uses Geisco's and the Fed's networks in a cooperative venture. According to Gary Singer, secretary-treasurer of Nacha, the primary issue still to be resolved by Geisco and the regional ACHs is the settlement function, or how the Fed makes a payment to a bank and debits another bank's account.

Joseph Loughry, Geisco's manager of financial services, said the regional ACHs have decided definitely that they want the Federal Reserve to continue its role of making the settlement payments to the banks.

Whether Geisco's network directly feeds a bank's net position as a receiver or payer to one of 11 Fed banks, which then orders the settlement transmitted to the other 10 Fed banks, or whether Geisco is directly feeding the net bank position to each of the 11 Fed banks, is still under discussion.

"We have already developed the applications software, particularly dealing with the settlement function," reported Loughry, who revealed that the proprietary software was originally written for the California-based Cal-Western ACH, for which Geisco is now performing EFT services. Loughry said that the Cal-Western software was transportable to the nationwide system.

Robert Brubaker, immediate past-president of Nacha and senior vice-president at Pittsburgh's Equibank, said the availability of settlement software was the primary reason Geisco was selected over other computer services companies that sought the Nacha job. McDonnell Douglas Automation Co. was the other finalist in consideration for Nacha's private-sector system, Brubaker said.

"Really, the issue is now at the local ACH level, where a decision will have to be made whether to link into the private-sector system as well as

into the Fed's," Brubaker said, who added that the ultimate EFT system used by the banks will be a "dual system."

Brubaker said the Fed has quickly moved to upgrade the technology of its own EFT system with a new plan — ACH '84 — that mirrors the all-electronic payment system being offered by Geisco.

He said that the Fed plans to have the ACH '84 system operational by the first quarter of 1985, the same time that the ACHs and banks will be deciding whether to link with Geisco.

"We are very interested in the private-sector processing of interbank payments because [the Fed's] prices have been rising. One of the things

that has also been happening and probably will continue is the merger of ACHs," Brubaker added.
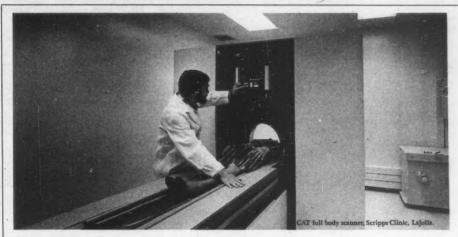
"We now will have options with the private-sector system, which should make EFT more efficient," he said.

Among the features that a "pure electronic" payments system will offer banks are 24-hour operations, timeliness and availability over the current system, unlimited capacity, continuous-flow processing, data confidentiality and security, management reporting and statistical analysis, transaction warehousing, automated returns processing and on-line client inquiry capabilities.

The Nacha push to make a private-

sector EFT system available to banks is prompted by the rising costs of processing checks for banks. Brubaker said that settlement costs a bank between 80 cents and $1.50 per paper check vs. pennies for an electronic transaction. "Unfortunately we have oversold the public on the use of paper checks, and we hope to change that," Brubaker said.

Geisco facilities are located in Rockville, Md., and the Nacha private-sector processing system would be added onto Geisco CPUs now used for remote computer services, in particular, three IBM 3081s operating in a shared direct-access storage device environment with the MVS/XA operating system.

Symphony gets mixed reviews from beta test site

By Paul Korzeniowski
CW Staff

BLOOMFIELD, Conn. — A beta test user of Lotus Development Corp.'s Symphony integrated software package has given the product a lukewarm endorsement.

While Symphony boasts word processing and communications functions absent in Lotus 1-2-3, it is difficult to master, does not easily integrate data and lacks the versatility of stand-alone packages, according to Rich Reed, manager of personal computer administration at Cigna Corp., an insurer here.

"Users have to realize that there are compromises with integrated packages," said Reed, who has worked with a beta copy of Symphony since April. "They often sacrifice functionality and ease of use for integration."

While Cigna has about 600 1-2-3 users, Reed is unsure of how many users will eventually upgrade to Symphony. "We will determine upgrades on a case-by-case basis," Reed said. "For some users, Symphony makes sense; for others, it doesn't."

The upgrade involves more than exchanging 1-2-3 for Symphony, Reed noted. Cigna's IBM Personal Computers, equipped with 384K bytes of random-access memory (RAM) and a hard disk, will have to be expanded to 512K bytes of RAM.

"I tested Symphony with an IBM Personal Computer with [384K bytes of RAM]," said Mark Bernacki, lead senior analyst at Cigna. "When I loaded a 200-row by 30-col. spreadsheet, the program ran out of memory after loading the first 30 rows. In

[512K bytes of RAM], the spreadsheet worked smoothly. I like Symphony's spreadsheet. It's faster and has better windowing capabilities than 1-2-3."

Another upgrade consideration is ease of use. "Some users may not need the power and functionality that Symphony offers and may find it is easier to work with a less complicated program such as 1-2-3," Reed noted.

Experienced 1-2-3 users may not intuitively understand how to manipulate Symphony. "Some Symphony commands are different from those in 1-2-3," Reed explained. "One has to track what environment one is in, for example, spreadsheet or word processing, and where in that environment they are to enter appropriate commands."

Major consideration

So training "is a major consideration for determining how many users will upgrade to Symphony," Bernacki reported. "We estimated that 30 hours of training are needed to learn Symphony."

The command sequence differences may also render 1-2-3 macros, which are single commands that execute multiple keystrokes, inoperable. "We are examining our macros to determine which have to be changed and which can still be used," Bernacki noted.

Despite the fact that 1-2-3 and Symphony are closely related products, data cannot be transferred easily between the two programs. "Data from 1-2-3 can be loaded into Symphony, but not vice versa," Reed said. "This may cause a problem

for workers who share data with their managers. Also, since Symphony and 1-2-3 use different file suffixes, 1-2-3 files are not listed when a user reads a disk for Symphony files."

Other limitations emerge when one attempts to transfer data among Symphony's five applications. "It is easy to transfer data written in tabular form," Reed said. "But there are problems transferring data to and from the word processing application. Many operations resemble simple cut-and-paste routines."

Yet, word processing represents the key difference between 1-2-3 and Symphony. "Many potential users may buy Symphony rather than 1-2-3 and a word processing package such as [Micropro International Corp.'s] Wordstar or [Multimate Software Systems, Inc.'s] Multimate," Bernacki said.

Symphony's word processing facilities are not as good as these packages' features, according to Reed. "Symphony's word processing capabilities are a bit weak," he said. Shortcomings cited were the absence of page breaks, the requirement of manual indentation and the word processing application's unique commands. "It will take a user a great deal of time to become familiar with the word processing application," Reed said.

Poor documentation presented a significant challenge to Reed's evaluation. "I was working with galley proofs that were very crude," Reed said. "I may have been more comfortable with the product if I had better documentation. It took me two-and-a-half weeks to become comfortable with Symphony."

Framework, Symphony even in integrated software ratings

By Paul Korzeniowski
CW Staff

Which is the better integrated micro software package, Lotus Develoment Corp.'s Symphony or Ashton-Tate's Framework?

Neither, according to a sampling of industry observers and corporate software users recently interviewed, who said both products contain features that will satisfy some users and flaws that may anger others.

Symphony, they felt, seems destined to assure Lotus of its place as the leading software supplier to the number-crunching community. "Lotus has gambled that integrated products are destined for power users," said Richard Strauss, vice-president of products at Corporate Software, Inc., a Waltham, Mass., microcomputer software distributor.

"Manipulating data with Symphony is like walking through a deep cavern," Eric E. Vogt, president of Micro Mentor, Inc., remarked. "After making a few turns, one never knows where one will surface."

While many industry watchers have criticized Symphony's complexity, one observer said the criticism was unwarranted. "Corporations have to be willing to spend time to train potential users," noted David Ferris, president of Ferrin Corp., a San Francisco personal computer services company. "The benefits always outweigh the brief training investment."

While some users praised Symphony's spreadsheet capabilities, they criticized its word processor. "Symphony is basically a spread-

sheet with a word processor wedged into it," Corporate Software's Strauss said.

Ferris noted that Symphony's word processor resembles Micropro International Corp.'s Wordstar of three years ago. "It's crude and lacks a number of full-function word processing features," Ferris remarked.

Despite Symphony's billing as a fully integrated offering, its integration is limited. "Symphony is designed as one spreadsheet file that contains all data files," said Morton Rosenthal, chairman of Corporate Software. "Merging and manipulating files is difficult."

To merge files, users have to identify where in the spreadsheet the files reside, determine how much space they require and make sure that the desired destination has sufficient space to store the files.

In certain cases, integration among Symphony's applications is also limited, Strauss said. "There are constraints for sharing data among spreadsheet, graphics and word processing applications," he remarked.

Framework and Symphony were each scheduled for shipment July 2. Lotus met its commitment; Ashton-Tate's decision to add communications software to Framework delayed its shipment date and raised certain questions. "Our customers' concerns about Framework are primarily whether the product is complete and bug-free rather than how well it works. Some question whether Framework's other applications are sufficiently sophisticated for power users," Rosenthal stated.

Multiapplication packages: Who needs them?

By Paul Korzeniowski
CW Staff

Who needs a five- or six-application, integrated micro software program?

Vendors, led by Lotus Development Corp. and Ashton-Tate, are attempting to convince users that everyone needs these packages. Yet users have not been fully persuaded, according to recent interviews.

Neil Cookrish, product manager in the information management services department at Bankers Trust New York Corp., said, "I question whether any user legitimately requires five or six applications."

Richard Strauss, vice-president of products at Corporate Software, Inc., a Waltham, Mass., corporate microcomputer software distributor, added, "Integrated packages are examples of overkill — they limit functionality by trying to cater to everyone. They resemble the pocket calculator in the early 1970s. It started out with simple functions like adding and subtracting. Then, companies added functions like sine, cosine and square root, which most people never used."

Many users do not even require all the features of stand-alone packages. "Most people only use 20% to 30% of the functions of most packages," according to Dan Spinner, vice-president of marketing at Management Information Software Co., a corporate microcomputer software distributor based in New York.

According to Strauss, integrated products offer more applications at the cost of less functionality than stand-alone programs. "Integrated

products offer a permeation of compromises; users do not receive the market's best data base manager, word processor or spreadsheet," Strauss claimed.

The reason for the compromises is that current hardware is unable to drive multiapplication packages. "Products like [Ashton-Tate's] Framework and [Lotus'] Symphony strain the capabilities of the IBM Personal Computer," Strauss added. "These packages require micros with more powerful processors."

Hardware limitations force vendors to offer only levels of integration. "Some vendors' claims are at best optimistic; at worst, they are severely misleading," stated David Ferris, president of Ferrin Corp., a San Francisco personal computer services company. He noted that some integrated programs offer no more than cut-and-paste techniques for sharing data.

One manager is looking to a different method to share data. "We want to provide our users with the opportunity to take 1-2-3 and plug in a statistical analysis package," Cookrish said. "We would like to see an operating shell that allows plug-in software and is user-friendly. We have just begun designing that type of package."

Cookrish described a product like Quarterdeck Software Co.'s Desq and Microsoft Corp.'s proposed Windows, but did not think that either matched his company's needs.

Cookrish's search for an operating system shell is atypical. "Since Framework and Symphony were announced, we have seen a decrease in interest in products like Desq," Spinner claimed.

NEWS

GRAY from page 1

ock's with its first computer system. "I began writing programs," Gray said, "and I found I loved it." It was the beginning of a new profession in a fascinating world that offered the chance to combine logical thinking and creativity, Gray said.

"I liked the discipline of programming," Gray explained. "I liked its puzzle dimensions. Someone would say: 'Here's a problem. Now go figure out a solution.' That really intrigued me."

He began as a programmer and, as he put it, "worked [his] way through. the department, one job at a time," until the late 1960s, when he was named director of the MIS department.

A few years later, he moved into the position of controller, with the data processing department still under his wing. In the mid-1970s, Gray became vice-president of finance, which brought the firm's credit program and legal activities under his care as well. In the summer of 1983, he was appointed executive vice-president of Bullock's.

According to Gray, data processing experience is a terrific asset for an executive in the retail industry because it provides a "qualitative understanding of the business" through its broad exposure to the various levels of the company and through the in-depth view it offers.

"If you work as a systems analyst or programmer in the accounts payable department, you really learn accounts payable; you really learn the nature of the application," he explained.

Yet, Gray acknowledged, it is rare to find an individual in the data processing department who is as adept at managing people as he is at managing bits and bytes. For those who have the calling, Bullock's provides guidance and support in the form of a management development training class held twice a year. In 14 sessions, Gray and other senior managers teach their pupils how to become better managers.

When asked to name the qualities necessary to move from the data processing department into a managerial post, Gray was quick to answer.

"There are six qualities that are important," he said. "A lot of people might be good in four categories but deficient in two, which will be a real handicap to their success," he

AWC elects president

WASHINGTON, D.C. — The Association for Women in Computing has elected Virginia C. Walker, a data base manager for the Energy Information Administration in Washington, D.C., as its president for the 1984-85 year.

Walker has been a member of the association's national board of directors since its inception in 1978 and recently completed a two-year stint as its program vice-president.

At its annual conference in July, the association also awarded its Augusta Ada Lovelace award for professional excellence to Dr. Ruth M. Davis, president of the Pymatuning Group, Inc. in Washington, D.C.

warned.
According to Gray, a successful manager:

■ Is smart.
■ Is a hard worker, which for Gray translates into a willingness to put in long hours on the job.
■ Has "people empathy" skills.
■ Is a good communicator, both written and verbal.
■ Is ambitious.
■ Has a sense of humor.

The company that taught Gray about bits and bytes continues to "home grow" much of its data processing staff in programmer's training classes that teach DP to specially selected Bullock's employees and college students. After an intense four months, the students graduate to a programmer position. According to Gray, the class produces more than 90% of the firm's staff.

Sentence set in IBM slayings

WASHINGTON, D.C. — A Maryland county Circuit Court last week sentenced Charles Thomas Mann, a former IBM employee, to 1,080 years plus three consecutive life terms for a 1982 shooting spree at an IBM facility that left three dead and others wounded.
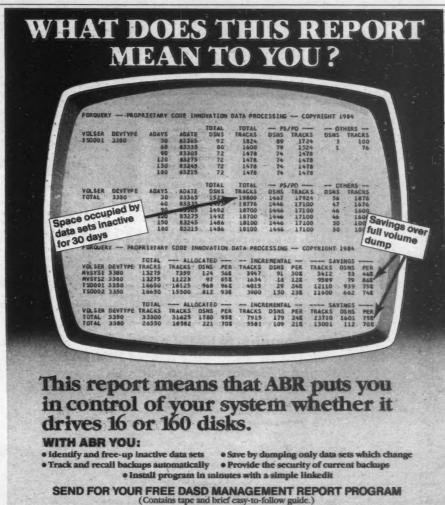
Mann originally sought an insanity defense claim, but changed his mind after lengthy psychiatric counseling.

Mann said the motivation for the shooting spree was prompted by the fact that he had been laid off from his job at IBM. He also felt that because he was black, he was being denied an opportunity to advance at the company.

Montgomery County Circuit Judge William Miller permitted Mann, at his sentencing, to address the courtroom for an hour, during which Mann discussed the conditions of the penal system and not the shootings.

"The statement, like the crimes [Mann] committed, evidences a twisted mind," commented Miller, who noted also that Mann had "failed to beg the court for forgiveness."

The three left dead after Mann drove his car into the lobby of the IBM building in Bethesda, Md., and opened fire with a machine gun were Hung Phi Nguyen, Larry Lewis Thompson and Jesse Robert Lewis. The shootings took place May 28, 1982 [CW, June 7, 1982].

NEWS

NYSE system bears up under record stock trading

By John Desmond
CW Staff
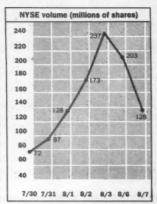
NEW YORK — If the number of shares traded Aug. 3 on the New York Stock Exchange (NYSE) had been traded any day two years ago, the computer center that processes the transactions probably would have been in trouble.

But the timing of the largest single trading day in Big Board history — capping a rally that began July 30 and culminated with 237 million shares exchanged on Aug. 3 — was fortunate for the Security Industries Automation Corp. (Siac), which processes the transactions. Siac is nearing completion of a $10 million, two-year effort to increase system capacity to accommodate a 250 million-share day, according to John McGee, vice-president of Siac corporate affairs.

Two years ago, system capacity was 150 million shares traded per day, McGee said. However, the work load for Siac is dictated not so much by the number of shares traded as by the number of individual transactions. Although Aug. 3 set the record for the number of shares traded, more individual transactions occurred last Monday, according to Donald Dueweke, senior vice-president of market operations for the NYSE. Transactions totaled 101,651 on Aug. 3 and 105,976 the next Monday, he said. (The record for transactions/day was set on Oct. 13, 1982, when 107,601 transactions were made, according to an NYSE spokesman.)

Though the number of shares traded on Aug. 3 was prodigious, system capacity was not reached, Dueweke said. Trading volume in messages per second on the Common Message Switch system, the interface between member firms ordering systems and the NYSE, was only 44% of capacity and 51% the following Monday, Dueweke said.
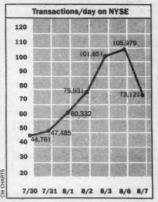
Siac, a subsidiary of the NYSE and

NYSE volume (millions of shares)

Transactions/day on NYSE

the American Stock Exchange, uses volume forecasts to project required CPU message rates. Siac completed its last system upgrade in the nick of time this year, just as the firm did in the summer of 1982, according to Charles McQuade, Siac president and chief executive officer.

Since trading records were set in the summer of 1982 [CW, Aug. 30, 1982], Siac has added an IBM 3083 mainframe, replaced an IBM 4341 mainframe with a 3031 mainframe and has added 50 Tandem Computers, Inc. transaction-oriented minicomputers to the 70 already in place, McQuade said. A number of Tandem fault-tolerant devices are also employed within the overall configuration. That configuration consists of two IBM 370/158s and a 370/148; two IBM 3033s; one IBM 4341; four Sperry Corp. mainframes: two 1100/82s and two 1100/60s; and nearly 40 Digital Equipment Corp. PDP-11/05, 11/45 and 11/70 minis.

If projections show that the volume is likely to exceed 250,000 transactions in a day, Siac can add more hardware. McGee said the decision was made four years ago to use a modular CPU architecture capable of expansion or even contraction.

Is there a physical limitation to system capacity based on how fast traders can execute orders?

"There doesn't seem to be," McQuade said, adding that the two recent heavy trading days were test enough for limitations. "Two hundred thirty-five million shares is just mind-boggling," he said. He noted that 72 million shares were traded in the first hour, and total trading exceeded the prior record — set just the previous day — by 65 million shares.

What happens if the system breaking point is reached? "There's no such thing as that," McQuade said.

For one thing, "more and more big players are out there," McQuade said, referring to the institutional investors that trade huge numbers of shares in one transaction. Block trades of at least 10,000 shares each represented 135 million of the total shares traded Aug. 3, McQuade said. The average number of shares per trade is 1,728 today, vs. half that number about five years ago, according to McGee.

If Siac's market reporting system

was down for more than a 10-minute period, McGee said, "There is a high probability that the market would have to cease trading." For that reason, he said, Siac puts "an extremely high premium on recoverability and availability" of the system.

Siac is involved not only in system support, order processing, trading and reporting, but in clearance and settlement for trades involving stocks, bonds, options and financial futures, McGee said. As a result of the record trading on Aug. 3, Siac was extremely busy immediately thereafter settling trades. "Right now, we're just beginning to be hit by what happened," he said last week. "That's a delayed reaction."

From one trader's point of view, the system reacted well to the record-breaking Aug. 3. "Considering that we had the highest volume in history, the system worked with a remarkable degree of efficiency," said Michael Geran of E. F. Hutton & Co. in New York. While the paper ticker lagged some 18 minutes behind in updating prices, the CRT screens posted prices only a few seconds later than usual, Geran said. He noted that both the ticker and the screens usually post prices at the same time.

Asked whether system capacity should be upgraded again in the wake of the recent trading records, Dueweke said, "Not unless market conditions change and we start looking at a push to the 300- to 350-million shares-per-day range."

Record trading pops red flags

NEW YORK — When record-high trading blitzed the New York Stock Exchange on Aug. 2, 3 and the following market day last Monday, red flags were raised in the exchange's Market Surveillance Services department.

Market Surveillance has established price and volume-trading parameters for stocks. When a parameter is exceeded, the stock is flagged and a review ensues. Record days of 237 million shares traded on Aug. 3, 203 million shares on Aug. 6 and 173 million shares on Aug. 2 kept the department very busy.

According to Agnes M. Gautier, a vice-president in Market Surveillance, "On high-volume days, the stocks did kick out because the prices moved up, hit the parameters and were flagged. From that point on, the system was working — probably too well."

Once a stock is flagged, it is reviewed by one of 16 analysts, each of whom specializes in two to three industries.

The analysts check the previous 30 to 40 days of the stock's trading, watching primarily for consistency with the market, Gautier said. Any aberrations are evaluated.

A typically detected error is the result of input errors on the trading floor.

NEWS

AI market orientation evidenced by AAAI-84 entries

CW AT AAAI-84

AUSTIN, Texas — The increasing commercial market orientation of artificial intelligence technology was evidenced by the variety of product introductions at the American Association of Artificial Intelligence National Conference on Artificial Intelligence (AAAI-84) held here last week.

Digital Equipment Corp. took advantage of the conference, jointly sponsored by the AAAI and the University of Texas at Austin, to announce a series of agreements signed recently with five independent producers of AI software. The agreements call for DEC to market jointly with the companies six AI-oriented packages for DEC's VAX-11 and microcomputer lines.

Among the products is Inference Corp.'s Automated Reasoning Tool, which was designed to help users create expert system applications. The system is written in DEC's recently released VAX Lisp language and runs under the VMS operating system.

Also included is Gold Hill Computers, Inc.'s Golden Common Lisp, which runs on DEC's Rainbow 100 and 100 Plus systems under Microsoft Corp.'s MS-DOS. A subset of Common Lisp, the system is said to be compatible with VAX Lisp and is designed for application development and to provide a training environment for programmers.

The University of Southern California Information Sciences Institute's Interlisp Lisp-based programming environment was also included in DEC's announcement. Interlisp is designed for use in AI research and development and runs under VMS and Unix on VAX-11 systems.

Prolog II from Prologia S.A. of France will also be offered through DEC. The package is said to be an arithmetic implementation of the Prolog language. It runs under VMS and can be used for AI product research and development and application programming.

The remaining products in the DEC announcement were developed by the Carnegie Group, Inc. The Plume package is said to be a tool for constructing natural language interfaces to data bases, expert and simulation systems and other applications. The SRL+ package reportedly is an integrated environment for the development of knowledge-based systems. Both are written in Common Lisp and operate under VMS.

A spokesman for DEC said the packages are currently undergoing DEC's in-house evaluation, and prices are scheduled to be released individually following that process. DEC can be reached at Maynard, Mass. 01754.

Tektronix announcements

Tektronix, Inc. announced the 4404 Artificial Intelligence System, which a spokesman said is designed to support AI research and application system development. The system provides a programming environment that includes a microprocessor, a user interface employing mouse technology and bit-mapped graphics and optional networking capabilities. It includes Xerox Corp.'s Smalltalk-80 programming language, with the Lisp and Prolog languages available as options.

The standard 4404 is a desktop system featuring the Smalltalk-80 programming environment running on a Motorola, Inc. 68010 microprocessor with a hardware accelerator that supports floating-point operations. It includes 1M byte of random-access memory with page-on-demand memory management, which provides an 8M-byte virtual-memory address space that permits complex program development without segmentation or overlays.

The 4404 Artificial Intelligence System is priced at $14,950 from Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

In other hardware announcements, Lisp Machine, Inc. introduced its LMI Lambda 4X4 four-user Lisp computer. The system is said to be a full-function software development workstation that utilizes the firm's Lambda family parallel processing capabilities to allow four fully independent Lisp processors to share power supplies, communications, tapes and disk storage facilities.

According to a spokesman, each user on the 4X4 system has access to an LMI Lambda Lisp processor and can utilize an individual keyboard and mouse pointer, a high-resolution display and a display controller.

The LMI Lambda 4X4 is priced at $45,000 per user from Lisp Machine, 6033 W. Century Blvd., Los Angeles, Calif. 90045.

Intellicorp announced Version 2.0 of its Knowledge Engineering Environment (KEE), a software system that reportedly enables users to develop knowledge-based systems.

Version 2.0 is said to offer a logic-based language called Tellandask that combines a data base query language with expert system deductive capabilities.

Version 2.0 of KEE is priced at $60,000 for the first CPU from Intellicorp, 707 Laurel St., Menlo Park, Calif. 94025.

NEWS

Future cloudy for AI in traditional DP, proponents say

CW AT AAAI-84

By John Gallant
CW Staff

AUSTIN, Texas — Artificial intelligence systems may well be the wave of the future, but even proponents of that technology are uncertain of how it will fare in the world of traditional data processing.

"In what we now know as DP, AI will not find a place," said Dr. Joseph Dreussi, a member of the technical staff of Lisp Machine, Inc., which markets Lisp processing equipment.

"But DP is changing. The so-called fourth-generation hardware and software showed people that they did not need a DP shop to get their information-related jobs done. Microcomputer spreadsheets are an example of that. Those fourth-generation tools are certainly not AI, but people are beginning to look at AI as an approach to that same issue on a scale broader than just spreadsheets," he said.

Dreussi was one of several authorities in the field of AI interviewed by *Computerworld* at last week's American Association for Artificial Intelligence National Conference on Artificial Intelligence (AAAI-84) held here. Despite the fact that he sees no role for AI in traditional DP, Dreussi said the push for adoption of that technology has come from both users and DP professionals.

"DP managers realize that they cannot hope to meet the future demands for information with the current tools. AI is not needed for existing applications, such as payroll systems. The current software technology works fairly well in that area. But AI will be needed for the more sophisticated applications that will arise in the future," he said.

Dreussi earned his Ph.D. in computer science with a concentration in AI at the University of Texas at Austin. Before joining Lisp Machine, he worked in the areas of robotics and problem-solving systems. His views on the future of AI in commercial DP were countered by Larry Geisel, president of the Carnegie Group, Inc., an AI software manufacturing firm.

"Some AI applications are already moving into production systems and have even replaced traditional MIS systems," Geisel said. "AI is being driven into mainstream markets because of the high paybacks it offers. Conventional DP techniques are only useful in satisfying a certain portion of a firm's information requirements. After a point, those traditional tools run into a barrier. AI can crack through that barrier with its fresh approach to information processing," he said. Geisel worked in the areas of software development and MIS management before founding the Carnegie Group.

According to Alexander Jacobson, president of Inference Corp., the AI applications that will move the technology into the mainstream are currently under development and should reach the market in the next two years.

Jacobson, who has a Ph.D. in electrical engineering, said the beauty of AI lies in its generic nature, which makes any human task a possible application for AI.

"There are at least three main forces that will push AI into the commercial marketplace," he said. "Hardware is getting to be dirt cheap, and these powerful, cheap computers will have to be put to new uses. Also, there is a need to make computers do more than crunch numbers. Traditional systems are not adequate for nonprofessionals. AI can bridge that gap.

"The final factor is political. Projects in other countries are spurring research and investment in AI in the U.S.," Jacobson continued. "That investment means that products will be available for new applications."

But he and others admitted that it will take some time for users to overcome their apprehensions about the new technology. Jacobson said people are nervous about investing money in AI systems, a factor that will hinder market growth. Lisp Machine's Dreussi expanded on the point.
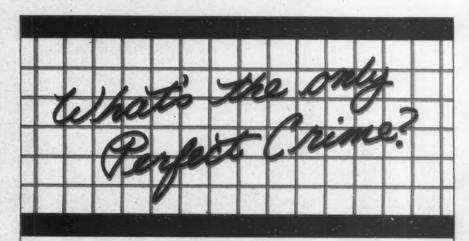
"Educating people is very important right now. When users see that AI isn't a mysterious, black-box kind of thing, it will begin to win acceptance. That is happening slowly, but it is something that you cannot force on people," he said.

The Carnegie Group's Geisel outlined another problem that may impede AI's commercial adoption.

"The major limitation right now is in the area of skilled personnel who can implement these systems in corporate MIS departments. It will really be tough to expand that base of training and experience.
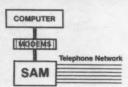
The three also conceded that the prices of AI products will have to fall before they become attractive to a wider user population. "We need a low-cost, effective delivery vehicle for AI applications," Geisel said. "We need a low-cost AI workstation and better communications capabilities to tie such a machine into the existing hardware and software base. That will make AI tools compatible with mainstream DP."

NEWS

Vendors see AI a stage in evolution, prepare for survival of fittest

By John Gallant
CW Staff

AUSTIN, Texas — Traditional systems manufacturers entering the artificial intelligence product race said they see AI as simply the next stage in the evolution of computer technology. But they intend to have products ready to meet user demands in that rapidly approaching stage.

"We see AI as the next generation of general-purpose computers. There is nothing magic about it. If we want to continue to be a leading supplier of systems, we must offer AI tools to prospective customers and to our existing user base," said William Kaiser, manager of AI market development for Apollo Computer, Inc.

Kaiser was one of several systems vendor representatives interviewed by *Computerworld* last week at the American Association for Artificial Intelligence National Conference on Artificial Intelligence (AAAI-84) here. A supplier of workstations used primarily in computer-aided design and engineering and computer-aided software engineering, Apollo recently forayed into the AI marketplace with the introduction of its Domain Lisp version of Portable Standard Lisp for use on the company's Domain workstations.

"We do not like to look at AI as a market per se," Kaiser said. "We see it as where the industry is moving. If AI becomes the way of computing in the future, then the opportunities will be as big as the entire market for computers. . . . Ultimately, we believe it will be the way people do business."

Kaiser's comments were echoed by Charles Piper, AI product marketing manager for Data General Corp.'s Technical Products Division. Like Apollo, DG is a recent entrant in the AI products race. The company demonstrated for the first time at AAAI-84 its Common Lisp Programming Environment, which operates on DG's Eclipse/MV line of microcomputers.

"I think companies that try to sell what they label AI products are in for a shock," Piper said. "People are not saying, 'I want aritificial intelligence systems.' They are looking for new ways to solve problems; they are looking for answers. We want to be ready to provide those answers. We aim to integrate AI technology into our product line for that reason. The Common Lisp envi-

ronment is the first step in that process.

"AI simply represents an evolution in technology," Piper continued. "It is not this great split between old and new. It is one more stage in a continuum."

With a similar view of the future of AI technology, according to R. J. Mathew, Digital Equipment Corp. is taking an evolutionary approach to developing and marketing AI products. Mathew is a member of DEC's Artificial Intelligence Marketing Group. In addition to its recently introduced VAX Lisp and OPS5 AI products, DEC announced last week that it will jointly market with other manufacturers six AI software products for use on the company's
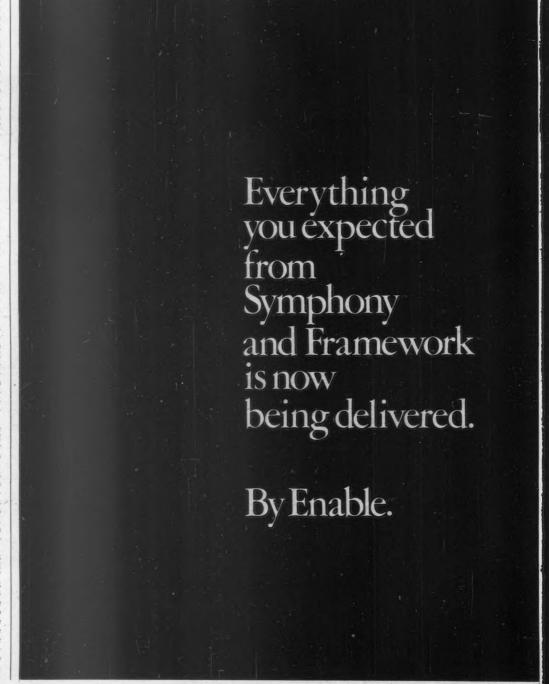
VAX-11 and microcomputer lines.

"DEC is primarily a systems manufacturer and supplier, and we will continue to address the market that way," Mathew said. "But we are moving in a careful, evolutionary manner toward AI because we want to take our customer base with us.

"We plan to let them ac-

cess AI technology through their existing hardware and software systems," he added. "We are taking that approach to allow users to maximize the return on their current investments."

Mathew and his peers at DG and Apollo said that AI technology will likely make its first commercial inroads in the area of expert systems.

NEWS

Researcher outlines natural language systems' potentials, problems

CW AT AAAI-84

By John Gallant
CW Staff

AUSTIN, Texas — One day in the future, computer systems will be equipped with user manuals that are only one page long.

That, according to Dr. Wendy Lehnert, is the goal of natural language processing systems researchers, who are trying to make the wealth of computer-based data available to the widest possible range of users.

Lehnert is an associate professor of computer and information science at the University of Massachusetts and former vice-president of research at Cognitive Systems, Inc. During a session at last week's American Association of Artificial Intelligence National Conference on Artificial Intelligence (AAAI-84) here, Lehnert gave users practical advice on the selection and implementation of natural language processing systems and outlined some of the pitfalls involved in developing them.

According to Lehnert, one-page manuals will become a reality in the future, because true natural language processing machine interfaces will allow users to extract information from data bases using English or an English-like language without knowledge of the computer's operating procedures.

She said natural language processing systems will produce dramatic solutions to a variety of user interface problems in commercial DP applications.

But she cautioned prospective users to avoid what she called the "black box" problem in evaluating a natural language processing system. That problem arises when a user makes a quality judgment based only on the inputs that drive the system and the resulting statements with which it responds.

"Without knowledge of how a system handles inputs to make its outputs, you cannot hope to evaluate a natural language system properly," Lehnert said.

To illustrate that point, she outlined two early systems that were described as natural language processors. The first provided a technical interface used by geologists to access a geological data base, and the second system offered responses similar to those a psychiatrist would advance when prompted by a user "patient."

While the second system seemed more sophisticated on the basis of its warm, personal output, Lehnert said, it was not a natural language processor at all. Rather, the system was a simple program utilizing key word pattern recognition that did little more than repeat user statements in a different format. The technical interface, while outwardly less elegant, actually worked as a true natural language system that processed user input to facilitate data base access.

"The [psychiatric] system is typical of the limited, trivial programs that are often labeled artificial intelligence," Lehnert said. "The [technical interface system] had to understand the input to answer the question and did not simply respond to word patterns."

Lehnert gave session attendees an opportunity to see firsthand the difficulties that researchers face in designing a true natural language processing system.

"Take for example the phrase 'the appearance of the man under the tree with a broken branch near the edge of the road to the town with a market.' While your mind can understand the meanings and the context of the words, that phrase has 429 syntactically possible interpretations that the natural language processor must consider in determining the most accurate meaning. That gives you some idea of the complexity involved," Lehnert said.

NEWS

What is AI? Some views from the conference floor

By John Gallant
CW Staff

AUSTIN, Texas — One stumbling block in any discussion of artificial intelligence is defining exactly what constitutes AI. *Computerworld* gave visitors to last week's American Association for Artificial Intelligence (AAAI-84) National Conference on Artificial Intelligence an opportunity to express just what they think AI is all about.

Brian Rees, artificial intelligence marketing manager, Europe, for Digital Equipment Corp. International, Geneva:

"That is an interesting question to ask of a person from Europe. The term AI is not used very often there.

We tend to speak of these things as knowledge-based systems, which I see as simply a continuation of basic software technology.

"AI is an evolution of technology, not a revolution. Some people in AI say we will forget all that we have done before. But that is unreasonable. We are applying new tools to old technology to make use of all the information we have amassed. AI represents a radical departure from old ways of thinking, but it is nothing more than an evolution in technology."

Gary Goodman, director of research and development, Scott Instruments, Inc., Denton, Texas:

"The simple definition of AI is

that it is human intelligence that is machine-based. If a machine exhibits that type of intelligence, then it is artificially intelligent. The crux of the question is how to judge whether a machine shows intelligence.

"If the system can learn, perceive and make valid predictions, then it is exhibiting intelligence; it is showing human-like qualities. If people using the machine cannot determine whether they are interacting with a computer or another human, then the system clearly is intelligent artificially."

Ralph Butler, Ph.D. candidate in computer science, University of Missouri at Rolla:

"I see AI as a form of machine de-

sign that permits the computer to become a very good assistant to a human. I do not think a machine will ever be as intelligent as a person, but AI technology lets the system become a true helper. AI lets the system gain the knowledge of an expert in a particular field to make it a valuable assistant to a worker in that field."

Joseph Scullion, NCR Corp. liason representative, artificial intelligence program of Microelectronics and Computer Technology Corp., Austin, Texas:

"It is not really fair to ask what constitutes AI. There are as many definitions of AI as there are people to answer the question. The trivial answer is that AI allows machines to behave in the manner of human beings.

"A more complex definition of AI involves discussion of areas such as the behavior of learning, planning, making judgments, robotics and vision systems, to name only a few. The complexity of the technical sessions here gives you an idea of how much AI encompasses. The problem with easy answers is that they miss the point and spawn misunderstanding of what AI really is."

Virginia Lyons, manager of documentation, Ashton-Tate, Culver City, Calif.:

"AI involves a machine that tries to emulate human behavior. The machine has certain knowledge coded into it, and based on that knowledge, it makes decisions and provides responses to questions as though it was an expert, so to speak. That type of AI machine, while just coming into being, is not a new idea."

Rina Dechter, Ph.D. candidate in computer science at the University of California at Los Angeles:

"AI technology tries to make the performance of a computer appear similar to that of a human. The output should appear to one person as though it came from another. The form of the output, whether it comes from a voice system or a natural language processor, is not important. What is important is that it appears identical to human efforts."

Xerox launches AI systems unit

AUSTIN, Texas — In response to growing market demand for artificial-intelligence-based products, Xerox Corp. last week announced the formation of its Artificial Intelligence Systems Business Unit.

The announcement, made during the American Association of Artificial Intelligence (AAAI-84) National Conference on Artificial Intelligence here, stated that the new business unit is a response to what Xerox believes will be a significant increase in the AI marketplace during the next two to five years.

Xerox currently markets two models of AI workstations — the Xerox 1108 and the Xerox 1132 — each of which was designed for individual use and includes a variety of memory, processor and disk drive capabilities. The workstations utilize Xerox's Interlisp-D software.

NEWS

RUTH DAVIS

After a long and illustrious government career, Dr. Ruth M. Davis made the jump to the private sector when she launched her own consulting company in 1981. Some of the posts Davis has held include Director of the Institute for Computer Sciences and Technology at the National Bureau of Standards; Assistant Secretary of Energy; and Undersecretary of Defense in charge of Research and Advanced Technology. Davis' long list of honors and awards includes Department of Energy Distinguished Service Medal (1981); the Department of Defense Distinguished Service Medal (1979); honorary doctorate of engineering from Carnegie-Mellon University (1979); and the Data Processing Management Association Computer Science Man of the Year Award (1979).

In July, Davis took a few moments out of her hectic schedule to tell Computerworld's International Editor, Susan Blakeney, her observations on computing and the government and her role in each.

Q *In 1979, when you were Undersecretary of Defense for Advanced Technology, you told the Data Processing Management Association that you thought not enough DP professionals were in high, influential corporate positions or in influential positions in government. Do you still think that's true?*

Yes, I think it's true — I know it's true — for both men and women. It's been absolutely amazing to me, with the computer industry so dominant and with everything from national security to our checking accounts dependent upon computers, we have so few people in policy-level positions that have any real, substantive knowledge of that field.

I think the reasons are severalfold — and I believe they'll disappear shortly. You normally went into the political world through the legal profession and/or the management field . . . and there was only one engineer in U.S. Congress in 1976. The fields of law and management have always been afraid of science and technology.

There has only recently been this nice, hybrid profession where you get a degree in engineering or in some scientific field and also a law degree. You've had hardly any scientists or engineers in Congress or in legislatures — that's beginning to change gradually as more scientists and engineers recognize that if you're going to exert influence, you can't do it from within the profession.

In the management of corporations and government, people were either, again, generalists, or if they were technical, they were from the traditional scientific and engineering field — physics. Almost every senior [R&D] policy official was from physics or chemistry for many, many years. And they very definitely tried to keep out the computer scientists.

Q *You think it was a conscious decision to keep them out of policy-level positions?*

Yes . . . it was not an admitted conscious decision, meaning that they didn't get together and say, 'We're not going to let computer scientists or engineers in.' It was just a subtle, unadmitted kind of decision.

I've heard so many times: 'Well, you can't have a science devoted to computers because a computer is a machine — so you can't have a science built around a machine.' That's absolute nonsense.

Computer types have, however, generally been very narrow. They've generally not had Ph.Ds, and they generally haven't branched out into other fields. Their greatest goal has been to be head of the computer center. They've let themselves be looked at as second-class citizens when it comes to policy or decision making or management. That has been changing within the last four to five years . . . it isn't changing very fast.

Q *In 1982, when the national economy was in the throes of a recession, you spoke at the National Computer Conference on 'A Computer Antidote for our Economic Ills.' What did you mean by that, and do you think the computer has provided the antidote?*

Computer science and technology was the principle area in which we were still the leaders in the world marketplace. That is not now generally true — you cannot make that statement [now] because the Japanese have swung in very hard.

But where there has been any real advance in architecture, or in products and speeds or characteristics of computers, we still hold the lead. Supercomputers, [for example]: We're still going to make it [first]. . . . And in the more basic areas of engineering — physics, surface chemistry changes as we go to gallium arsenide — we'll be able to make them work. The Japanese will be able to produce gallium arsenide, but we'll be able to translate it into faster processing speeds.

Good management and productivity really depend on computers, whether you're talking about [computer-aided design and manufacturing] or manufacturing technology, or the production industry or whether you're dependent on records management and record keeping in the service industry. The computer has provided the economic antidote for us, but it's also providing it for other countries.

Q *How has computing in the government changed during the various White House administrations that you've seen?*

Oh, I think the administrations in the government have had little impact on computing. I think the government and computing have changed at the speed that computing will allow, which is different [faster] from any other sector in the country. This is because the government has been the principle funder of computer R&D since its inception. It has been the principle innovator. That is still generally true. The only time [the government] gets behind is when Congress passes legislation that arbitrarily restricts it.

Q *What have been some of the most dramatic technology changes that you've witnessed over the years?*

First was the jump in supercomputers . . . the massive power of parallel processing; the speed of processing for large computational functions has just been dramatic. The second [change] is networking, which came [out of] government activities as well as government funding. Networking, I think, has changed the whole world. Banking is no longer domestic, information systems are no longer domestic, venture capitalism — real estate — nothing is domestic in the country because of networking.

Another main area [of change] is in real-time control, which translates into manufacturing technology now and into space [applications]. That's the one that probably excites me most — the ability to use computers with real-time control of very complex activities — whether it's medicine or space. And then, the development of sensors — humanoid sensors with hearing or vision as well as touch.

Q *Is it generally perceived that it's hard to keep computer or DP professionals in government, when they can make so much more in private sectors?*

It depends . . . why don't we change the term 'DP professional' to 'computer scientists and engineers?' [The government's] not keeping them. But don't forget, most of the R&D work was done under contract to the government by the aerospace and the defense industries. So they can do the same kind of work, and we all benefit anyway . . . and the goals are the same. The government doesn't lose.

Q *What do you mark among your greatest professional disappointments?*

The greatest one — the one that stands out above all others — is one that has happened to me three or four times. And that is I've always been a year to two years behind my male counterparts in getting the next job at the next higher level. I felt I should have been director of an organization a couple of years ahead of when I was.

Q *Did you blame yourself for this?*

Oh sure — one always does. You keep thinking, what if you had tried harder — even though you were a woman — maybe you could have made it. I had a guilt feeling all my career that I wasn't doing something right. I've never been comfortable with my career. I like that [humorist] who said, 'Guilt is the gift that keeps on giving.'

Q *What do you mark as your greatest professional accomplishments?*

I think the ability that I had at the two policy-level positions I held in government to really advance this country in several major areas. I'll give you the one you'd expect least first so you don't forget it — and that's [the development of] synthetic fuels which I really started in the Department of Defense and really pushed. We're [going to] need it. The other one is the advancement of computers for both national security and national welfare. That covers health and defense. I think that's what made me really feel great — I was able to do something.

Automated security system controls access to Olympic venues

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — An unpleasant surprise recently befell an adventurous sports fan who tried unsuccessfully to outwit the 23rd Olympiad's high-tech security system and sneak into some of the event's restricted locations.

The Summer Games were only a few days old when one of its more than 90,000 accredited visitors approached a popular Olympic venue with the intention of going inside. Casually flashing his official identification badge to a security guard, the visitor fully expected to be admitted to the venue without incident.

But to his amazement, his request to enter was denied, and his credentials were summarily confiscated.

The reason for the unexpected trouble soon became apparent. For security reasons, Games officials issued several categories of ID badges, some of which permitted wider access to Olympic facilities than others. Somehow, at least one of the event's accredited visitors had persuaded a credentials officer to issue him the wrong kind of badge, which gave him entry to sites that were supposed to have been off limits.

At any other Olympics, the visitor's deception almost certainly would have gone undetected. Here, however, the ruse was thwarted.

"When [the would-be interloper] was suddenly deprived of his credentials and was told he was barred from the venues entirely, he became very upset," according to Mike Mount, a vice-president with the Los Angeles Olympic Organizing Committee.

What reportedly undid the hapless visitor was an automated security system that used light pens and bar codes to control physical access to the quadrennial event's three Olympic Villages and 22 venues. The system was the first of its kind in Summer Games history, according to Jim Murray, the Los Angeles Olympic Organizing Committee's vice-president of technology.

Each of the 93,000 committee staff members, athletes, coaches, media representatives, contractors and other accredited Olympic visitors was issued his own laminated identification card bearing the recipient's name and photograph. Also printed on the badges was a machine-readable bar code similar to the ones that are scanned in supermarkets by electronic checkout systems. Each badge bore its own unique bar code.

To gain access to a desired Olympic site, an accredited visitor first had to present his badge to a security guard, who then scanned it with a bar code reader from Canton, Mass.-based Computer Identics, Inc. At least one such scanning system was installed at each Olympic Village or venue entrance.

After deciphering an ID card's bar code, the scanner consulted its local memory to find out whether the badge holder had been granted access to the site he was seeking to enter.

In the past, Murray recalled, security guards at the Games tried to spot attempted intrusions by "comparing people's faces [with] the pictures on their badges. It was a mainly visual process and wasn't very effective."

This year, however, the procedure for weeding out suspected trespassers worked differently. If a badge was reported missing, committee officials quickly invalidated it by updating their central credentials file, which contained the name of every accredited Olympic visitor and specified the locations each individual was authorized to enter. The credentials file resided in an IBM System/38 at committee headquarters.

From the System/38, notice of any badge invalidation was copied onto 5¼-in. floppy diskettes and then transferred first to IBM Personal Computers and finally to the bar code readers.

Smart Software is smartest choice.

MIS personnel chair micro policy committees: survey

CHICAGO — According to a survey answered by 1,339 members of the Association of Information Systems Professionals (AISP), MIS department personnel are most often assigned to supervise internal company committees charged with recommending microcomputer equipment, developing networks and updating current systems.

A number of different departments are usually represented on the internal committees, according to the survey presented here at the recent AISP-sponsored Syntopican XII Conference and Exposition.

Market Probe International, Inc. of New York conducted the survey for *Newsweek* magazine.

Questionnaires were mailed to 3,000 AISP professionals between April 27 and June 8.

Profile

The sample profile showed that of the respondents, nearly 75% were female, the average age was 38, over half were college graduates, one-fifth had graduate degrees and the average annual personal income was approximately $45,000. The most common areas of work for respondents were word processing (37%), information systems management and office management.

Other findings were:

■ Partial decentralization of information and data processing activities was reported by 32% of the micro user respondents.

■ A total of 24% reported achieving greater independence from centralized word processing or DP departments.

■ Word processing was the primary application of 57% of respondents, followed by education and training, communications, data base management and data input/analysis.

■ Electronic mail and communications are expected to become additional applications of micros in the work place.

■ In spreadsheet software, Visicorp's Visi Calc and Microsoft Corp.'s Multiplan were most often mentioned, and Micropro International Corp.'s Wordstar was mentioned three times more than any other word processing software.

■ The single most frequently reported package was Lotus Development Corp.'s 1-2-3, and among data base management packages, Ashton-Tate's Dbase II was most often mentioned.

■ In micro makes, IBM was used by 59% of users; Apple Computer, Inc. micros by 37%; Wang Laboratories, Inc., 17%; Radio Shack Corp., 17%; Digital Equipment Corp., 13%; Compaq Computer Corp., 12%; Hewlett-Packard Co., 9%; and Xerox Corp., 6%.

■ The most popular micro models cited were the IBM Personal Computer, the IBM Personal Computer XT, the Wang Professional Computer and Xerox models.

■ Problems most frequently cited in trying to achieve the best use of micros included: achieving compatibility with existing computers, integrating micros into company routines, training and retraining users and acquiring appropriate software and peripherals.

The survey is available for $25 (check payable to Newsweek, Inc.) from Advertising Resource Center, *Newsweek*, 444 Madison Ave., New York, N.Y. 10022.

Autofact 6 to target CIM

ANAHEIM, Calif. — Computer-integrated manufacturing (CIM) will be the focus of the Computer and Automated Systems Association of the Society of Manufacturing Engineers' (CASA/SME) Autofact 6 Conference and Exposition to be held at the Disneyland Hotel and Anaheim Convention Center here Oct. 1-4.

According to the sponsor, the theme of the Autofact 6 conference will be "CIM — Manufacturing in the Information Age."

Among the scheduled speakers for the conference's opening session are: John Hall, president of CASA/SME; Capt. Walter Schirra, former astronaut and an independent consultant with Morrison Co.; Dr. William Spurgeon, program manager for production research with the National Science Foundation; and Fred Houtz, manager of engineering for AT&T Technologies.

Session topics

Conference sessions will cover a variety of topics, including "Expert Systems," "Numerical Control," "Networking," "Common Data Bases," "CIM for Small Business," "Microcomputers," "Planning and Modeling for the Factory of the Future" and "Shop Floor Control." Three evening forums will be held on the subjects of "Human Resources," "Artificial Intelligence" and "Education."

The cost to attend the full conference is $450 for CASA/SME members and $520 for nonmembers.

More information is available from the Technical Activities Department, SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

NEWS

Nevada courts to undergo extensive computerization

By Edward Warner
CW Staff

CARSON CITY, Nev. — In what is said to be the most extensive program of its kind in the U.S., the state of Nevada is computerizing its court system and linking most of its computers with a central data base that will provide judges with up-to-date criminal records for defendants brought before them.

When the state's Uniform Register of Actions (UROA) computer system — expected to cost from $300,000 to $500,000 — is up and running a year from now, it will provide all of the state's courts with terminals and printers linked to supermicrocomputers at regional centers. The supermicros will run record-keeping software, store records and be linked with a central data base to be established here in the state capital. Most courts will also get on-site micros for WP and bookkeeping functions.

The central data base will tie together the far-flung courts of this large, rural state so that a judge in Las Vegas will, for example, know that the accused drunk driver brought before him had been convicted on the same charge only days before in Winnemucca.

Currently, said Harry Lipparelli, deputy director of the state's administrative office of the courts, the Las Vegas judge would be unlikely to have such up-to-date knowledge at hand and might hand down a lesser sentence than the state's rigid anti-drunk-driving law requires. Drunk drivers convicted of their third such offense in the state receive mandatory prison sentences.

But the biggest benefit of the new system, Lipparelli explained, will simply be to help the state's courts get out from under a costly and cumbersome burden of paperwork. "It's too expensive to keep records on these old docket books," Lipparelli said, adding that the computers will also let courts determine where scheduling logjams are developing.

The entire computer system is being provided by Alpha Microsystems, Inc., an Irvine, Calif., vendor of legal and other vertical market systems, through its Carson City dealer, Jimwest. Approximately 150 Alpha Microsystems AM60 terminals — at least one for each court — will be used in the system, some of them right in the courtroom, Lipparelli noted.

Alpha Microsystems' 70M-byte AM-1092 supermicro will be used at an as-yet-undetermined number of regional centers, a 70M-byte AM-1072 supermicro will house the state-level data base and several 30M-byte

AM-1000E micros will be used by the local courts as on-site processors, a Jimwest representative said.

The system's cost will be mostly paid for by a portion of the state's year-old, $10 "administrative assessment" being levied against people convicted of misdemeanors or violations of municipal ordinances.

Those offenders can have the dubious pleasure of knowing that exactly $2 of that assessment will go toward purchase of the court system's computers and the maintenance of the statewide data base that will house their criminal records.

Although the state's computerized court system was authorized just over a year

ago, the first implementation of the system — set for the town of Battle Mountain — is still not yet fully on-line, and court officials throughout the state are still mulling over the form their local systems should take.

At the Battle Mountain Justice Court, Deputy Court Clerk Ruth Bishop said the system's software for track-

ing traffic citations, including the revenue and bench warrants they generate, is running, but the software for the court's bookkeeping and other functions has yet to come on-line.

The Battle Mountain Justice Court's computer system may be typical of that planned for lower courts in

NEWS

Survey links workers' ailments to management factors

STAMFORD, Conn. — Health problems among VDT operators are more likely to stem from poor working conditions than from the terminals, the Data Entry Management Association (Dema) charged after a recent survey.

More than 60% of the 352 Dema members polled reported problems of eyestrain, back pain, fatigue and neck or shoulder pain.

But the VDT operators linked their ailments to inadequate working conditions such as poor lighting, uncomfortable chairs and poor management treatment of workers, not to the terminals, according to Dema President Norman Bodek.

Dema, which is based here and represents 1,600 data entry managers, supervisors and operators, mailed questionnaires to workers in 26 U.S. and Canadian companies in May. Those questionnaires asked the workers if they were currently experiencing any of 12 listed symptoms. Dema received responses from 352 VDT operators and from 140 clerical workers who do not use VDTs.

The survey forms also asked the workers for comments that focused on the probable cause of the medical problems and on what individual companies have done to reduce problems.

Terminal operators complained of eyestrain in 68.7% of the responses, and 61.7% of the clerical workers suffered from the same ailment. Respondents commented that in some companies, proper lighting and the use of mesh screens have reduced glare problems associated with VDTs and that paper, particularly photostatic copies and computer printouts, reflects light.

Back pain and fatigue

Back pain was a problem for 67% of the operators, but for only 36.2% of the clerical workers. Fatigue plagued 62.1% of the operators and 53.9% of the clerical workers, and neck or shoulder pain bothered 61.8% of the operators and 46.8% of the clerical workers.

Respondents and Bodek blamed the fatigue and pain on the types of chairs that workers use and the amount of time that workers must sit. Bodek noted that clerical workers often do not sit for the extended periods that VDT operators must, accounting for the almost double incidence of back pain for operators.

Operators commented that proper back supports, foot rests and rest breaks with stretching exercises reduce back problems and fatigue.

Other survey results included complaints of burning or irritated eyes from 44.4% of the operators and 44% of the clerical workers, general irritability from 39.9% of the operators and 26.2% of the clerical workers, blurred vision from 36.5% of the operators and 24.8% of the clerical workers, arm or leg pain from 35.3% of the operators and 17% of the clerical workers, nervousness from 27.6% of the operators and 19.1% of the clerical workers, stomach pain from 11.7% of the operators and 9.2% of the clerical workers, swollen muscles or joints from 11.4% of the operators and 11.3% of the clerical workers and skin rashes from 6.8% of the operators and 5.7% of the clerical workers.

Bodek blamed the health problems on what in many cases may be sweatshop working conditions. "We managers have spent so much time and energy on making the jobs so routine and have placed so much emphasis on output that we've neglected our most important resource — our people. And then we're surprised when we discover that we are the major obstacle to our people's productivity. What's the root cause of these problems? Chairs? Lighting? I don't think so. I think it's management's attitude that is the source of these types of problems," Bodek said.

Federal meet set for Sept. 18-20

WASHINGTON, D.C. — "Harnessing ADP Technology" is the topic of the Seventh Annual Federal Computer Conference, to convene here Sept. 18-20 at the Washington Convention Center.

Kenneth Olsen, president and founder of Digital Equipment Corp., is the keynote speaker for the program, which is sponsored by the National Council for Education on Information Strategies.

During the three-day program, 130 federal and industry representatives will conduct full-day seminars and half-day sessions on topics such as microcomputers, software strategies, networks and technology assessment. Management briefings and product workshops will also be part of the program.

More than 250 firms are expected to demonstrate their equipment and services at this year's conference.

Registration fees range from $95 for federal employees attending the day-long main conference program to $395 for nonfederal personnel attending the full three-day program.

More information is available from the Federal Computer Conference through P.O. Box N, Wayland, Mass. 01778.

NEWS

Bug in jury selection system picks on one town's citizens

By Maura McEnaney
CW Staff

BOSTON — The jury is still out on the exact reasons behind a computer foul-up here that caused the state of Massachusetts' computerized jury selection process to summon a disproportionate number of residents from Malden, a community just north of Boston.

The jury selection process has significantly aided the Massachusetts Office of the Jury Commissioner in its gradual implementation of the nation's first "one-day,

one-trial" statewide jury system. Under the new system, scheduled to be in full swing within five years, there are limited exceptions for jury duty dismissal, and summoned jurors must sit through one day of selection or through one trial.

Using annual residential street listings and a Burroughs Corp. B6800 mainframe, the jury commissioner's office compiles data bases of potential jurors in three of the state's 14 counties and is responsible for sending out approximately

8,000 computer-generated summonses each week, according to Joseph Countie, data base manager. The result, Countie said, is jury pools that correspond with the population mix in each county.

But the system recently caused some headaches for DP professionals when its randomized selection turned out to be not so random. Last month, jury pools in Middlesex County (1980 population of 1,367,034) consistently contained an abundance of jurors from Malden, with a population of about 53,386.

According to published reports, one day in June, 42 — or 37.5% — of the 112 jurors summoned to Middlesex Superior Court were from Malden, even though the community makes up only 3.7% of the county's population.

Countie said the department became aware of the problem only when "we began to notice there was an extraordinarily large amount of mail [going out] to Malden."

Last week, Countie and others in the department were still trying to determine exactly what had gone wrong

with the system and its selection process. One possibility, Countie said, was a problem with a mathematical formula called Randu, used in the in-house program to select potential jurors randomly for each city or town. When selected, a percentage of the names are shuffled and fed into a county data base from which the jury pools are selected.

According to Countie, there could have been a problem in the program's shuffling system when the names were first shuffled last fall. Each county is shuffled separately, and there have been no problems with other counties, he said.

Jury Commissioner Paul Carr added, "Something must have happened when

Middlesex was on-line. We put it on Friday, and it took a whole weekend to run. Maybe it didn't go to the end of job or crashed along the way."

Besides, Carr said, it is far more important that the county's 125,000 jurors were originally randomly selected (which they were) than that they were called at random (which they weren't). Ideally, the department first selects jurors randomly, puts all those names into a data base, shuffles and calls names in a way that should be random again.

Countie said he has rewritten the program and reshuffled the names that have not yet been called. "I'm prepared to shuffle two or three times," he said.

COURT from page 21

Nevada towns: an Alpha Microsystems AM-1072 microcomputer acting as host and linked with five Alpha Microsystems AM60 terminals, a modem, a printer and a videocassette recorder used to back up the system and store software.

Large Nevada cities, Lipparelli noted, will have more extensive systems and may even adopt the computerized jury management software now in use in Las Vegas for its one-day, one-trial program. Jurors there, Lipparelli explained, are contacted by letters generated by that court's computer (not a part of UROA) that tell them when and where to appear for jury duty.

The computer virtually guarantees that jurors will serve on the day they are scheduled and only on that day. It even generates thankyou letters to the jurors after they have performed their public service.

The Las Vegas jury system is "literally saving thousands of dollars," Lipparelli said, and its software will likely be adopted by the UROA system for use by other courts.

Other software that will be available under the state's computerized system includes that for bookkeeping, word processing, statistical analysis and the creation of electronic forms, which will replace the plethora of paper forms presently in use.

First user tries automation system as remote monitor

WILMINGTON, Mass. — A factory automation software package in its premier installation at Dynamics Research Corp. (DRC) here is being used for long-range production planning at a plant that is not owned by DRC and is not even located in the state of Massachusetts.

Such are the mysteries of the world of contract compliance monitoring.

DRC is using the software, the TEC System from TEC Computer Systems, Inc. of Newton, Mass., as part of its contract with the federal government to assist the monitored plant with production planning for a product the plant is making under its own federal contract. DRC management systems section manager Jeff Harris refused to identify the plant or the product it is making for the government, other than to say that the product is a "very sophisticated instrument" that must meet a manufacturing schedule of one unit produced every 18 months.

DRC's TEC System cost roughly $80,000 and provides inventory control, bill of materials automation, production scheduling and material requirements planning functions, he said.

The software, he explained, provides long-range production planning information to the monitored plant, based on data provided to DRC by the plant's management.

Unlike most manufacturing automation programs, though, DRC's system does not operate on-line with a shop floor to track inventory and to schedule production supplies.

Instead, Harris said, the monitored plant provides production data to DRC via regular uploads from its Datapoint Corp. 1560 microcomputer to DRC's Honeywell, Inc. mainframe. At DRC, the data is taken from the mainframe and input to the TEC System software, running on a Digital Equipment Corp. VAX-11/780.

The plant also provides written reports to DRC, which Harris said are "timely, not to the minute . . . but sufficient" for long-range planning.

The TEC System software, in turn, can warn of impending production difficulties — a looming shortage of raw materials, for example — that could cause the plant to miss a production deadline. When such hitches appear likely, Harris said, DRC tries to be tactful in telling the monitored factory. "Obviously, we kind of sit in an outsider's role," he said. "We're not trying to blow whistles; we're just trying to help the government and the [manufacturing] company get the job done."

Best feature

One of the best features of the software, Harris said, is its ability to incorporate the plant's existing system for tracking parts salvaged from those "sophisticated instruments" that fail a quality control test and are cannibalized. The salvaged-parts tracking feature was customized to the software by TEC Computer Systems, Harris said. "This is one of the reasons we chose TEC; they understand our problems," he explained.

Harris added that he was also impressed with the TEC System's documentation, which included a full set of function manuals, its Help functions and the fact that the software lets users "walk through a [logic] tree of screens to get what [they] want."

The only difficulty that DRC has experienced so far with the TEC System, Harris added, is that it is running on a minicomputer that is already supporting 35 terminals and a host of demands from other users. Delays have sometimes resulted, he noted, but that is really not a problem, since the software's job is long-range planning.

DRC initially looked at the manufacturing automation products of more than 50 vendors before narrowing the field to 10 and requesting demonstrations.

NEWS

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AUSTRALIA

MELBOURNE — A large order, calling for an IBM 3084 system, six IBM 4361 mainframes and over 80 IBM 3180 terminals, will effectively double the computing power of National Mutual Trust and Guarantee Life Co. here. The equipment will be used to extend financial services in the bank's network of processors in mainland cities, with Tasmania hooked to Victoria by communications lines, according to a company spokesman.

SYDNEY — The Australian Industry Development Corp. (AIDC) has earmarked $419,000 to establish a software publishing house to foster and coordinate the development and promotion of Unix operating system software in Australia and abroad. An existing company, Fawnray Pty. Ltd., which specializes in Unix-based applications, will be the focus of AIDC's efforts, with AIDC assuming a 47% interest in that company, sources said.

BRAZIL

RIO DE JANEIRO — Financially troubled Cobra, the government-controlled Brazilian computer maker, still lacks the money and technology needed for the development of large-scale computer systems here. This is in spite of the recent appointment of Fernando Azevedo as president of the ailing firm and despite the influx of funds from the government's National Bank for Social and Economic Development, sources reported. The company may issue stock to raise additional money. At the same time, the company's board of directors is reportedly discussing other financial options, such as purchasing existing technology from Japan's Fujitsu Ltd., NEC Corp. or Hitachi Ltd. Technology from two U.S. firms, AT&T and

Amsterdam site of security meet

AMSTERDAM — The 1984 International Computer Security Congress is slated to take place here Sept. 17-19.

The conference is intended for computer professionals involved in implementing, specifying or authorizing security procedures for the protection of physical assets and computer data, according to conference sponsor Riant Consultants, a Dutch organization specializing in computer security and training. Riant said the conference will feature security experts from around the world.

Registration for the conference starts at $600, with group discounts available.

Additional information is available from the Reservation Center through P.O. Box 3387, 1001 AD Amsterdam, Netherlands.

Digital Equipment Corp., is also under consideration.

HONG KONG

HONG KONG — The IBM 5550 microcomputer has finally made its debut here as a Chinese-language small business and personal computer, according to the vendor. Based on the Intel Corp. 8088 chip, the 5550 is the first IBM system to incorporate both hardware and software specifically designed to process information in Chinese, according to IBM World Trade Corp. Manager Joseph Movizzo. He said the 5550 keyboard only has 61 character keys because the system incorporates the Cheong Kit input method. Cheong Kit is based on the radical elements of a character. It combines those elements to form desired characters.

SINGAPORE

SINGAPORE — SAS Institute, Inc. a U.S. firm that claims to have more than 15,000 computer software packages installed in some 52 countries, has established a satellite office here. The expansion was reportedly timed to coincide with the availability of the SAS System on Digital Equipment Corp. and Data General Corp. minicomputers. According to a SAS spokesman, there are over 400 SAS installations in Asia alone, assisting industrial, commercial, academic and government computer users with SAS data analysis and reporting applications.

SINGAPORE — The Public Utility Board here will boast the first Asian installation of software from Walker Interactive Products, Inc. of the U.S. The software will be used for the utility board's $860,000 materials management information system. At the same time, the board has become a user of Cullinet Software, Inc.'s IDMS data base management system.

WEST GERMANY

MUNICH — The West German computer maker Beta Systems is having problems finding the necessary funds to acquire the bankrupt Victor Technology Corp. The takeover is being watched by Victor's director, Juergen Tepper, who said, "We don't feel under pressure. . . . We will take our good time to choose a reasonable partner."

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From left to right application software from: Mentor Graphics Corp., Interleaf, Auto-Trol, Swanson Analysis Systems, Inc., Racal-Redac, Automated Impact, GE/CAE International, ORACLE Corp. and GE Calma Co.

Design drawing of a bulkhead.

Documentation with integrated graphics and text.

Finite element analysis of gear cluster.

Logic design simulation.

NEWS

Computer firms tapping pool of programming talent

By Donna Raimondi
CW Staff

Disabled: Incapacitated by illness, injury or wounds — Webster's Ninth New Collegiate Dictionary.

"So a person is disabled; that doesn't say his mind is gone. There are a lot of people who are disabled but still have a good, working mind." — Joe Erney, Control Data Institute course monitor who has been suffering from rheumatoid arthritis since 1975.

MINNEAPOLIS — Employers are turning in increasing numbers to a hitherto neglected pool of programming talent — the handicapped — as more and more disabled people at-tempt to enter the work force.

Joan Orke discovered at age nine that she had progressive arthritis. By the time she was in her early 20s, she was crippled to the point of having to give up her job and apartment in Minneapolis and move back home with her parents, 90 miles away. There, she spent two years in bed, unable to perform even the smallest chores. For the next couple of years, able to get about only on crutches or in a wheelchair, Orke lived on Social Security disability benefits. Depressed and bored, she called the Minnesota State Department of Vocational Rehabilitation

Orke

and pleaded with them to find something she could do.

"People want to be positive, contributing members of society. Being out of that throws them into desperation," Orke said. The rehabilitation agency suggested that she apply for Control Data Corp.'s Homework program. At first, Orke was frightened. She knew nothing about computers and was totally intimidated by them. A Homework instructor came to her house to interview her and demonstrate CDC's Programmed Logic for Automatic Teaching Operations (Plato) computer-based instructional system. "The
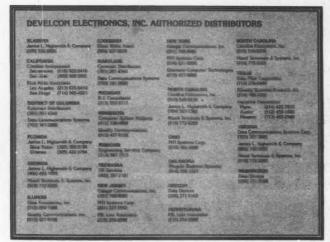
Plato system helps because it is so user-friendly," Orke said. She could communicate with other students online, and CDC supplied games to play to help demystify the computer.

In eight months of instruction, Orke studied a series of introductory courses (to Plato, the Homework program and computer math), in addition to the rudiments of Basic and Cobol and a brief on-line course in analysis and design.

Sent out 200 resumes

After completing the course, Orke sent out 200 resumes, briefly explaining her situation and training. A few responses came from people who said they did not hire entry-level pro-

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The Develcon Model 2X212: A sensible approach to network cost-effectiveness, with two independent RS232C interfaces in one modem. Half the desk space, half the line costs and twice the efficiency. Since you don't find one product that does the work of two every day, now is the time to get in touch with us or an authorized Develcon distributor for full technical details or applications assistance.

The Develcon Model 2X212 handles two simultaneous data conversations over a single line. It detects errors, automatically re-transmits original data, saves desk space, and, most importantly, cuts line costs in half.

Retraining plan grows at CDC

Control Data Corp. has been involved in a computer-based education program called Homework since 1978. Started as an effort to retrain injured employees at CDC, the program has grown into a three-phase training project for disabled people nationwide.

CDC found that the direct cost of maintaining employees on medical leaves of absence — assuming disability extends to age 65 — costs from 14 to 30 times more than providing disabled employees with a good education in programming, depending upon the age at which disability occurs.

The CDC project is carried out in conjunction with state agencies nationwide that make referrals to the program and supply funding. CDC provides Programmed Logic for Automatic Teaching Operations (Plato), a computer-based instructional system that uses plasma display terminals hooked up to a mainframe in CDC's Minneapolis office to teach business application programming languages.

Phase One is an evaluation of the potential student's motivation and suitability. The students' disabilities include blindness, deafness, mobility impairment and para- and quadraplegia. The student must be highly motivated, as he must work alone at home for up to two years to complete training. Only those potential students who prove their aptitude for programming are accepted.

Phase Two is the delivery of at-home training. Instructors visit students occasionally, but most training is done on-line.

Placement is the third phase of the program. Special Homework counselors work independently or with a state agency to find a buyer for the new programmer's services. In addition to tax breaks sometimes realized by hiring disabled people, the employer knows he is getting a fully trained, reliable employee.

Information on the Homework program is available from Ralph McCrae, manager, CDC Homework Marketing, P.O. Box 0, Minneapolis, Minn. 55440.

NEWS

while giving handicapped new outlook on work, life

grammers, but would be interested after she had some experience. However, there were no interview offers.

At the same time, CDC was contacting large companies for placement possibilities, and out of their efforts she received two interviews.

Orke was hired as an associate programmer by Honeywell, Inc. in Minneapolis. In the beginning, she worked at home, going into the office one afternoon a week for staff meetings. She now spends three afternoons a week in the office, because she feels that she is missing a lot by not being there. "Working at home, you don't get to know the other staff members. A lot of informal learning goes on when you work with other

people," Orke said.

Orke's supervisors at Honeywell empathize with her problems and are trying to help her overcome some of them. Orke is now in the process of documenting those problems to establish a protocol for handling them. One difficulty is that Orke does not have an interactive terminal and cannot communicate with her co-workers while she is home. If she is stuck, it can often take two to three hours to reach people for solutions. "I don't feel that any of these problems are insurmountable. If there's a solution, we'll find it," Orke said.

Excitement spills over when Orke talks about her life. She moved back to Minneapolis, has her own apart-

ment and a car and is close to having all her medical bills paid off. She just had her first vacation in five years and is happily planning a trip to Mexico in the winter. Orke spoke of a "marvelous change" in her life since she has become trained and employed, and she feels much better physically and emotionally. In May, she was promoted to programmer.

Asked about her chances for advancement, Orke said the division head that she works for at Honeywell is absolutely sure her chances are as good as anybody else's, but nevertheless she has some reservations. The natural progression is from associate programmer to programmer to programmer/analyst, and the program-

mer/analyst position involves a great deal of interaction with users. One of the characteristics that makes arthritis difficult to live with is fatigue, and Orke wonders how she could deal with users while extremely fatigued.

As for her contribution to the company, Orke said, "I have a really good production rate. I'm not distracted by the noise and lighting of a busy office, so I can concentrate. I think home programmers are always more productive." Orke is particulary interested in helping Honeywell expand its involvement with home workers. "People who have been out of work are much more grateful for their jobs, more apt to work hard," she said.

IBM programs fund training for disabled

The precursor of IBM's Project With Industry program for the severely physically disabled was started in 1972 with the suggestion of a then recently disabled employee. Experience gained from first efforts and from a federally funded survey conducted by IBM identified a need for a continuing training program.

The goal of IBM's effort is to establish self-sustaining and locally operated projects to select, train and assist disabled people in becoming gainfully employed. IBM
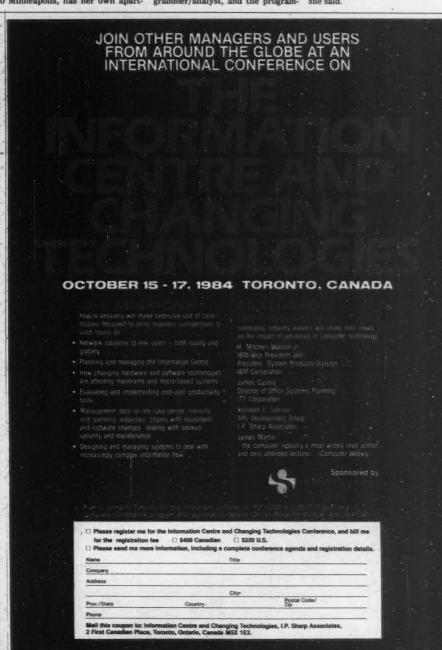
Local business advisory councils in each targeted area establish a curriculum to meet local business needs.

serves, in an advisory capacity, state vocational rehabilitation agencies that select candidates for the nine-month program. Applicants are chosen based on above-average intelligence and results from various aptitude tests that are determined by the involved agencies.

Local business advisory councils in each targeted area establish a curriculum to meet local business needs. Job placement opportunities for the trainees develop through local agencies and the business advisory councils.

At this time, there are 28 active IBM computer programmer training projects throughout the U.S. Over 80% of those completing the course have been placed in self-sustaining jobs, totalling more than 1,000 placements.

More information on the program is available from IBM's Federal Systems Division, which is located at 6600 Rockledge Drive, Bethesda, Md. 20817.

NEWS

SDC program trains visually impaired

System Development Corp. (SDC), a Burroughs Corp. subsidiary that provides software design and development for both the aerospace industry and the government, has for 18 years run a program that has produced more than 200 entry-level programmers.

Earl Sheffield manages the eight-month-long Visually Handicapped Programmer Training course, which covers an introduction to programming and programming in Cobol and Pascal languages.

The State of California's Department of Rehabilitation locates and recommends blind or visually impaired candidates. SDC pays for the class facilities, computer time and instructors, and the Department of Rehabilitation subsidizes housing and income.

Standardized testing must show that the prospective trainee has an IQ of 115 or better and a very high ability to do logical reasoning. The Rehabilitation Department also must guarantee that the candidate is independent, that is, able to travel back and forth to classes on his own.

Blind students use tape recorders, Maryland Computer Services, Inc.'s talking terminals and Perkins Braillers (a typewriter-like device invented approximately 50 years ago) to take notes. Telecentury Systems, Inc.'s Optacon hand-held electronic scanner reads printed material and outputs a matrix of pins that students feel with their fingertips to identify letters. This device reads hard copy and, with an adapter, CRT screens.

Information on the program can be obtained from Earl Sheffield, SDC, 2500 Colorado Ave., Santa Monica, Calif. 90406.

JAN aids firms hiring disabled employees

Employers in business and industry are increasingly willing to hire from a great untapped pool of workers — disabled people — but because of lost production or the high costs of maintaining an out-of-work employee, the disability often belongs to the company. Responding to private-sector employers' questions of how to modify work spaces to enable the hiring of special needs employees, the President's Committee on Employment of the Handicapped (PCEH), the National Institute of Handicapped Research and the Rehabilitation Services Administration instituted the Job Accommodation Network (JAN) this past May.

JAN collects information about special accommodations in a computerized data base that is used to find practical solutions to adaptation problems. To date, the data base contains more than 1,700 accommodation information entries that include job modifications, assistive devices, scheduling changes and work place adaptations. PCEH projects that, by the end of this year, there will be 3,000 entries. JAN will be fully operational this month.
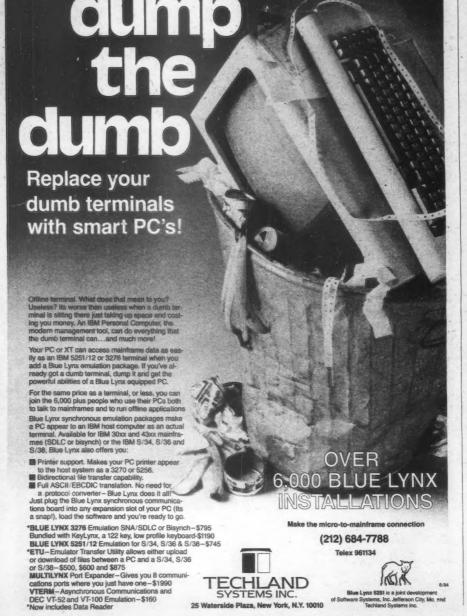
Any business willing to share its job accommodation experience with JAN may use JAN's resources free of charge. The employer must answer a few questions designed to identify precisely the acceptable limitations of disabled job applicants, what kinds of adaptations are needed and job requirements.

An abstract of suggested solutions to the employer's problem is available and is either mailed or electronically transmitted to the employer. Included in this information are the names and phone numbers of employers who have agreed to share similar job experiences and the cost of such arrangements. (Solutions can be as simple as office furniture rearrangement or as complicated as the acquisition of sophisticated equipment.)

Contributors to JAN's data base include ITT, AT&T, Prudential Insurance Co., Honeywell, Inc. and the National Restaurant Association.

The Job Accommodation Network for employers is operational now at its national toll-free number: 1-800-JAN-PCEH.

Customized system takes care of health firm's growth

SYOSSET, N.Y. — Statistics reveal that by 1990, one out of every five people in the U.S. will be age 70 or over. This aging trend is a major factor in the growth of this country's home health care industry.

U.S. Health Extension Services, Inc. (HES), based here, has experienced exceptional growth as a result of this trend. With consolidated after-tax earnings of 40% from 1981 to 1983, HES President Martin Weissman attributed part of his company's success to its customized computerization.

To help keep pace with the company's fast growth, HES enlisted Jerome Gilbert, president of Cornell Computer Corp., a 13-year-old firm that provides consulting services to businesses ranging from health care and pharmaceuticals to banking, retailing and government agencies.

Customized software

In 1979, Gilbert advised Weissman to computerize, and Gilbert selected the IBM System/34, operating under RPG II, as the system to use. The key to the system's capabilities and productivity is Cornell's customized software developed for the home health care industry. Under this system, information is transmitted via facsimile machines to HES' Long Island, N.Y., headquarters from outlying operating offices.

The headquarters office houses 16 CRT terminals and two high-speed printers that handle the 5,000 bills sent to third-party payees each week and that create 5,000 weekly paychecks for nurses and paramedic personnel.

The customized system requires one input to create the various checks, namely, a time record that is transmitted from each of the offices via facsimile. The system also generates management reports that show gross profit per case per week, sales, payroll and a work sheet created for each HES office. The work sheet lists each professional operating from that office, its past billings and the pay rate for each employee.

Due to HES' growth rate, however, Gilbert recently recommended that Cornell Computer further expand the system.

The current computer is the core of a centralized system that works well with a smaller volume of paperwork. According to Weissman, "What is now required is an information system that will significantly condense paperwork and provide for smooth integration of our acquisitions and accommodate new government forms. It must be able to store and retrieve employee records and

perform accounting, inventory and number manipulation tasks as well as word processing and credit collection procedures. In addition, it has to be easily expandable."

Based on these parameters, HES decided to implement a Wang Laboratories, Inc. VS-100 distributed system that provides access

from each branch office. Local HES offices will eventually have a microcomputer to perform time slip data entry (formerly done in Syosset).

This data will then be forwarded daily or weekly, depending on volume, to the central computer here. The central unit will also be able to communicate with the desktop branch computers

and can update files, employee records and government-mandated procedures for all operating offices. Time slip and other information will be transmitted directly to the main computer from operating offices and automatically processed, bypassing the extra steps involved in manual input.

The new system will, in

addition, orchestrate a sales and rental equipment inventory for HES' medical equipment operations. Other features include automatic stock replenishment orders, cost accounting, billing, general ledger and number-crunching tasks that are necessary additions to provide management control of product movement.

Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up. Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

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NEWS

Package helps food outlet spice up its on-line, batch operations

GRAND RAPIDS, Mich. — Spartan Stores, Inc. is the twelfth largest food wholesaler in the U.S. In attaining that rank, Spartan ran into problems developing and maintaining systems to support both its own growth and that of its client stores.

Spartan, based here, is "owned" by its 470 member stores across Michigan, Indiana and Ohio. It provides automated warehousing of grocery items plus support services for its retail outlets.

The DP department at Spartan is a rapidly growing Cobol shop that consists of about 110 people. Much of the work done here supports the corporation in the usual ways (payroll, accounts payable), but the DP shop also develops applications for any of its stores that want services. Within this department, there are five application development groups, each with a leader and between seven and 11 analysts and programmers.

Two IBM mainframes, a 4341 and a 3083, which now run on the DOS/CICS operating system, form the heart of Spartan's data center. Fred Van Assen, senior systems analyst, said that the machines will be converted to IBM's MVS operating system in the near future to increase their power.

Need for speed

With 1,500 to 2,000 jobs processed in the center each week, and with one computer devoted to development all day, every day, Spartan's management saw the need to speed up development and maintenance of both on-line and batch applications systems, Van Assen said.

With a shopping list of needs, Van Assen and Paul Glasier, senior programmer, looked at 105 offerings from several companies. After studying each product carefully, the two decided that the Umbrella System from Hogan Systems, Inc. met most of their requirements.

"We were looking for six types of tools — a data dictionary, system design aids, project management, document generation, batch and on-line code generation and report writing," Glasier said. "Of these six, Umbrella consolidated all but project management and system design into one product."

The ability to use Umbrella for either batch or on-line work was also a deciding factor. Umbrella encourages modular program design, which makes program changes and enhancements quicker and easier, Glasier said.
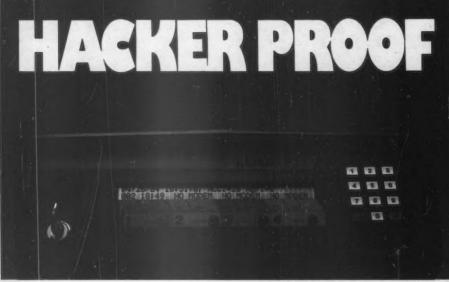
Hogan suggested a pilot project to test the system. That project started in March 1983, and six months later, Spartan reevaluated the system's merits. "We took a look at what we had learned," Glasier explained.

Few problems

"During that time, we used Umbrella to develop an application management and planning system." At the end of the test phase, Van Assen and Glasier had experienced few problems during project development and recommended that Spartan purchase Umbrella.

A problem that arose after installation was the staff's resistance to changing the way they operated. To alleviate that, training classes took place both at Hogan Systems and at Spartan, and some of Spartan's programmers and users continue to train others in-house. According to Van Assen, the training has been about 90% successful.

Van Assen estimated that Spartan is experiencing a 50% to 100% time savings in maintenance and as much as a 20% savings in the development stages.

"Both our retailers and our end users here at Spartan will benefit because the data processing department will be more able to respond to their needs," Van Assen said.

NEWS

Nabisco cuts messaging costs with electronic mail

PARSIPPANY, N.J. — Nabisco Brands, Inc. went from a punched-paper tape messaging system to electronic mail and saved 20% on its messaging operating costs.

Nabisco replaced its Western Union, Inc. Infocom message system with an electronic mail system that has brought with it a $14,000 monthly savings, equal to 20% of Nabisco's previous costs, and confidence that messages sent will be received, according to Nabisco's telecommunications director, Walter C. Jacobs.

Nabisco's new system, Worldwide Integrated Communications (Winc) from Mohawk Data Sciences, Inc. (MDS), transmits messages faster than the previous system and, most importantly, assures the sender that the message was received, something that was lacking with the Infocom system, Jacobs explained. Nabisco replaced Infocom with the electronic mail system, Jacobs said, because "We felt there were state-of-the-art advances in message switching that had gone beyond Infocom."

Nabisco's Winc system, used to transmit domestic and international messages and sales and shipping information, is composed of 35 MDS Series 21 distributed processing workstations and 19 MDS Messenger terminals.

The procedure

Messages are logged onto the workstations and terminals by Nabisco employees and, every 15 to 90 minutes, depending on the level of service selected, the MDS computer in Wilton, Conn., polls the terminals, sorts the messages and retransmits them to the addressee. When the addressee receives the message, a confirming notice is sent to the sender.

The Series 21 workstations can also be used for word processing and IBM 3270 terminal emulation; the Messenger terminals can communicate with Wang Laboratories, Inc. and IBM terminals, Jacobs said.

"One of the most important features of the network," added Larry Herzing, Nabisco's telecommunications project manager, "is its ability to expand to meet Nabisco's future needs. Winc was the best service for us, and the MDS terminals proved to be excellent."

By comparison, Jacobs said, the Infocom system had been based on telex terminals that had a three-row keyboard — less familiar to office workers — and produced a punched-paper tape. As a whole, he said, the Infocom system "was a little bit awkward. It's certainly not an automated process."

Getting the message

Jacobs said that the biggest difficulty the firm experienced with Infocom was being certain that messages sent were being received. Jacobs said some messages had gone astray and that employees were making follow-up telephone calls to those they had sent messages to in hopes of confirming the message's receipt.

But Jacobs was also quick to note that Western Union had provided the Infocom service to the firm for at least eight years and that no lost messages cost the firm any "million-dollar orders." Western Union, he continued, still has a good working relationship with Nabisco, and several telex terminals are still in use by Nabisco branch offices to send messages to branches already on the Winc system.

Nabisco began its search for a new message system with a request for proposals from a group of 40 vendors. The vendors, Jacobs said, were divided between those wanting Nabisco to develop its own in-house message center, a move that would require at least a minicomputer and two employees, and others who offered their public electronic mail services. The question became one of, "Was there enough traffic to bring in an in-house processor?" Jacobs said. The answer, Nabisco found, was no.

Instead, the firm chose Winc, largely because of its multifunctional terminals and reliability, Jacobs said, adding that there have been no major problems with the service since its introduction.

The $14,000 monthly savings, Jacobs said, came from Winc's reliance on Wats lines and its higher transmission rates. Winc, he said, transmits at 1,200 bit/sec; Infocom transmits at 110 bit/sec.

Nabisco senior telecommunications analyst Glenn Overman pointed out that TWX messages can now be sent directly to the receive-only port on the Messenger terminals, and telex messages are being received via Winc terminals set up as telex gateways.
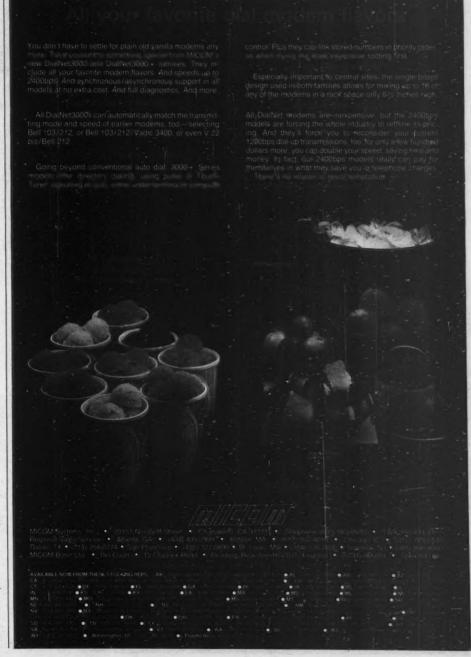
On the whole, "We went through a huge technological jump" by switching to Winc, Jacobs said, but "acceptance has been uniformly good."

The Winc system at Nabisco, he said, is an example of taking "this talk of the technological revolution" from the abstract to the concrete by telling employees, "Here's a tool that's going to help you do your job."

NEWS

Program aid performs many roles for service bureau

BUFFALO, N.Y. — Datek Instacard, Inc., a service bureau here, relies on a utility program generator for everything from report generation to file updating and the conversion of Ebcdic code to Ascii.

Datek initially installed the utility program generator, UPG from Mathis and Associates, Inc. of Coventry, R.I., in 1976 for the sole purpose of providing report generation.

The service bureau, whose primary business is serving client savings and loan associations, soon found that UPG had a high degree of versatility, according to George Knorr, Datek's vice-president of systems and programming.

The program generator has since been put to use "for all manners of applications," Knorr explained.

It has patched a software overlay onto another program, conducted file updating of an overdraft loan system and converted the data formats used at several remote data processing shops to the Datek format, and it has done so very effectively, Knorr said.

Added speed

The UPG software has also lent speed to his department, Knorr said, noting that in "90% of the cases, programmers can get what they are looking for in less time than it would take just to compile an [NCR Corp.] Neat/3 or Cobol program."

Knorr also noted that programs written in UPG run faster than those written using the Neat/3 assembler.

Besides providing speed, Knorr said, UPG has increased productivity to the point where it is "probably two to three times what it would be in our normal Neat/3 environment."

Datek purchased UPG over two other similar programs in 1976 and recovered its cost in three months, Knorr said.

Ease of use

Datek chose UPG, he said, for its ease of use and flexibility.

The software first ran on Datek's NCR Century 251 and is now shared by that processor and the firm's NCR Criterion 85/75.

Datek has also come to appreciate the software supplier's continual enhancement of its program, Knorr said.

Maintenance

He noted that Datek has paid $150 per year in maintenance fees for the software since it was purchased, and in return, the publisher "has never let it sit long enough to get old."

Knorr said he particularly appreciated "the attention that John Mathis [the publisher] has taken to upgrade and enhance the product continually."
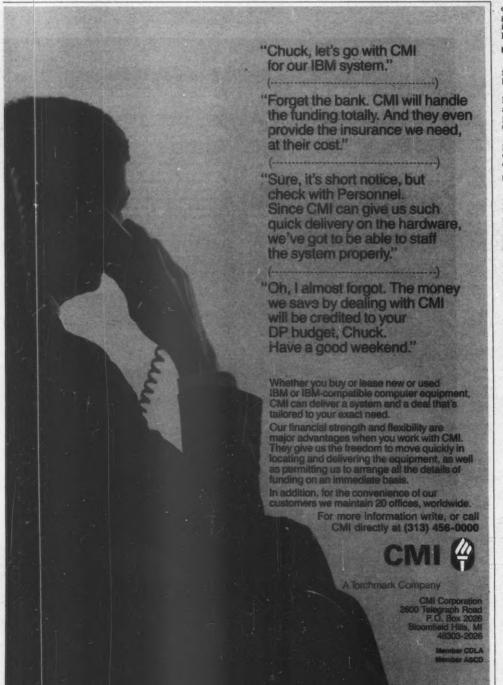
Knorr said he could recall only two hitches in the use of the software and that "both of those were to the point where you didn't need to get a patch right away" to keep the software running.

Operating system seminar set

NUTLEY, N.J. — Data-Tech Institute will present a two-day seminar that focuses on different operating systems Sept. 6-7 at the Sheraton National Hotel in Arlington, Va., and Sept. 13-14 at the Chase Park Plaza Hotel in St. Louis.

"Operating Systems: A Comparative Analysis — Micros to Mainframes" will cover processor management, storage management, system performance, networking and communications, Data-Tech said.

The seminar costs $595.

Additional information about the conference is available from Data-Tech Institute at 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110.

NEWS

System beefs up program development at food chain

ROCKY MOUNT, N.C. — Don Gladwell had a problem.

The director of systems development for Hardee's Food Systems, Inc., the third largest fast-food chain in the U.S., was trying to make command-level Cobol, operating under IBM's CICS, communicate with IBM's DMS format on Digital Equipment Corp. and IBM equipment.

Hardee's has approximately 160 terminals, and Gladwell's job was to try to make them all communicate:

While he said it would take days to write a program, it would typically take weeks to convert it to CICS command-level Cobol to allow for communications. "We had problems linking the two," Gladwell said.

Gladwell began shopping for a software package that would make communications easier. He evaluated a number of software products, including Oxford Software Corp.'s UFO; Multiplications, Inc.'s Accolade; and IBM's DMS.

He was in the process of evaluating all of these when he was told that Pansophic Systems, Inc. was demonstrating its Gener/OL product in Raleigh, N.C. Gladwell saw the demonstration and chose the product.

"The main reason for our choice was that no CICS expertise is required for using Gener/OL, while all of the other packages required that knowledge," Gladwell said. "With Gener/OL, everything is done within the one package, and there is no need to create links to CICS command-level code. We didn't want to go through that link."

Gener/OL was brought up at Hardee's in October 1983. Problems relating to the environment typical of any new software conversion arose, and Gladwell gave credit to Pansophic for being responsive.

Gener/OL has speeded the delivery of new programs at the company by up to 50%, Gladwell said, noting, "Now I can do a whole job in a few days." He added, "We feel that we will realize even greater time savings as our programmers continue to use it."

Gener/OL has been well accepted by the programming staff, Gladwell noted. "We have one programmer trainee who had not written any CICS programs whatsoever. She was able to learn Gener/OL very rapidly and felt that it was very easy to use," he said.

Gladwell added that another reason for the purchase of Gener/OL was the need to be able to develop screens for users. He explained that most of the data entry functions have been placed in the user areas.

"Data is collected every night from point-of-sale devices in 880 company-owned restaurants," he said. "If we miss a store for any reason, DP will call and collect that data from the manager. This situation dictated our need for a well-formulated screen, for easy input, [and] that is fast. Gener/OL allows edits at the screen so that we have no rejects in the batch system — the data entered is all good."
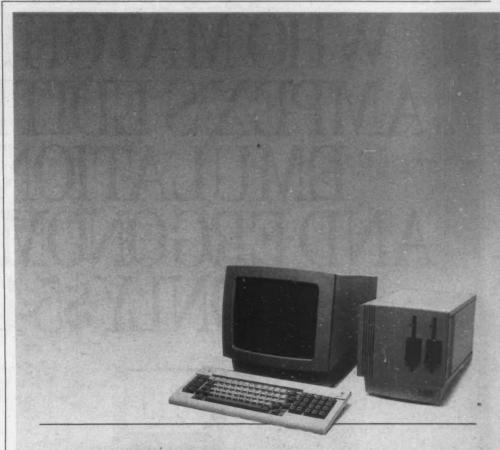
Gladwell observed that Gener/OL has helped to make Hardee's more competitive.

Hardee's Food Systems was founded in 1960 with one restaurant. In addition to its U.S. restaurants, Hardee's has restaurants in seven foreign countries and has over 32,000 employees. The firm is the food service division of Imasco U.S.A., Inc. and is wholly owned by Imasco Ltd. of Montreal.

Hardee's data processing division includes 15 people in systems development and 27 people in technical support, communications and operations. The division provides service to all financial departments, including accounts receivable, payroll/personnel and others. It also provides services to the restaurant operations and marketing area.

The hardware includes DEC equipment along with an IBM 4331 and an IBM 4341, both under DOS/VSE with VM.

NEWS

Merchandiser controls inventory with micro-CPU tool

RIVERSIDE, Calif. — Performing miracles is how Retail Merchandising Service Automation, Inc. (RSMA) describes its newest micro-mainframe software package, which is helping 400 apparel retailers, doing $3.25 billion worth of business annually, control inventories.

However, in this instance, it is spelled "Miracls," the acronym for Micro Inventory Reporting and Control System, which 100 RMSA field managers are using to help computerize merchandise and inventory control planning.

The backbone of the system is a communications unit with accompanying software that attaches to the host mainframe's — an IBM 360/30 — communications channel instead of transferring data through the front end of the mainframe. This unit and a proprietary software package allow store managers to obtain inventory feedback on sales from the RMSA host, which is directly connected to in-store IBM Personal Computer XT micros.

700,000 tickets

Until recently, RMSA was manually processing some 700,000 garment tickets a month, which retail stores collected when a piece of apparel was sold and which were then sent to the company.

Every piece of merchandise could be recorded and analyzed, enabling RMSA to make accurate recommendations about markdowns, reorders and store-to-store merchandise transfers.

Even though the system worked well, the processing of the ticket stubs was time-consuming, despite the introduction of bar codes on the stubs, which helped the apparel stores transmit sales information to the RMSA host computer.

However, there was one major obstacle. Neither RMSA's IBM 1403 nor 3211 line printers had the graphics capability to print bar codes for the stores. IBM's 3800 laser printer did have that capability, but RMSA did not want to spend $350,000 plus monthly usage charges to use it.

"Since we generate 700,000 garment tickets a month, the usage charges alone would have been murder," commented Steven Brown, RMSA's director of systems programming.

Lower cost dot matrix printers with graphics capabilities were available for printing bar codes, but, according to Brown, there was no cost-effective way to get the data from the host computer to the printers.

Hydra II

Then RMSA heard of Hydra II, a protocol converter distributed by Diversified Data Resources, Inc. of San Rafael, Calif. that could turn an asynchronous dot matrix printer into a local 1403 or 3211 printer. "This meant we weren't locked into an expensive laser printer," Brown said.

RMSA purchased a 16-port Hydra II and several Printronix, Inc. P600 printers to print bar codes for the apparel customers. The Hydra II is manufactured by JDS Microprocessing of Mission Viejo, Calif.

The Hydra II provides a similar interface with RS-232C printers to emulate local 3211, 1403, 3286, or 3287 printers. A general-purpose interface enables communications with RS-232C devices via a high-level protocol to transmit the data from the personal computer to the host.

Transmitting bar-coded garment tickets to the stores in some fashion other than express mail was the next step in RMSA's evolving service. It decided to send the information to the store, where an on-site printer could produce the bar code on the ticket.

Knowing that its customers were willing to invest in their own micros to aid in the inventory and sales control of their merchandise was a key to the evolution of Miracls, Brown said.

Data files could be transmitted directly to the customer's micro disk storage using a terminal emulator, since it "takes advantage of the async port and requires no additional hardware," Brown said. This meant there was no need for a protocol converter at the micro site.

'Lower overall cost'

"It has built-in, full-error checking and transfer of files into the asynchronous protocol, providing the reliability of a synchronous protocol at a lower overall cost," Brown added.

The emulator, also distributed by Diversified Data, has no file transfer capability. It allows an IBM Personal Computer XT to emulate a 3277, 3278 or a 3279 when attached to the Hydra II protocol converter. No protocol converter is required for the emulator to allow a Personal Computer XT to emulate a Digital Equipment Corp. VT52 or VT100.

The emulator and accompanying software is produced by Computer Vectors, Inc., also of Mission Viejo.

Since the implementation of the Miracls system, the transmission of processed ticket data to the customer is accomplished at the rate of 150 tickets per minute.

Ticket printing on-site is accomplished at approximately 10 to 15 tickets per minute. Reports back to the host and to the micro are sent at approximately 200 pages per minute.

RMSA provides its customers with 11 different reports on sales data generated by its Miracls system.

NEWS

MANAGERS ON THE MOVE

DAVID A. BROWNING has been promoted to manager of computer planning/telecommunications at Conoco, Inc., and MORRIS L. HELBACH will be promoted to replace Browning as manager of computer planning and user services for the company, a computer and telecommunications services firm in Ponca City, Okla.

Browning has been associated with Conoco since 1963. He became director of computer and telecommunications services in 1979 and was promoted to manager of computer planning and user services last year.

He graduated from Southwest Missouri State University with a B.S. in mathematics.

Helbach started with Conoco in Ponca City and worked there from 1970 to 1981. He worked briefly with an affiliated company in London and transferred to Houston as director of systems development in 1982.

He graduated with a B.S. in personnel from Oklahoma State University.

■

JOSEPH M. O'DONNELL, vice-president and information group manager for Conrac Corp. of Stamford, Conn., has been given responsibility for operations at Conrac's Alston Division in Duarte, Calif.

In addition to his new assignment, O'Donnell, who joined Conrac in March, will continue to manage the company's two domestic information display divisions.

Prior to joining Conrac, he was general manager of the Keyboard Division of ITT. Before that, he worked in the telecommunications and data communications department of General Instrument Corp.

He holds a B.S. in business and an MBA, both from the University of Tennessee.

WAYNE CATLETT has joined Atalla Corp. of San Jose, Calif., as director of secure telecommunications technology. He will lead a design team responsible for developing security products for personal computers. Applications for the products include home banking, corporate cash management, financial services, videotex, electronic mail, wire transfer and information services.

Prior to joining Atalla, Catlett was a partner in Xypher Security Systems of Minneapolis, where he developed devices for high-speed data encryption.

Atalla, in business since 1972, creates, manufactures and markets systems for secure electronic banking and data communications services.

■

JOSEPH J. COLLINS has been promoted to senior vice-president of corporate administration for Jefferson Ward in Miami. Jefferson Ward is a 44-store subsidiary of Montgomery Ward. Collins is responsible for management information systems, distribution, telecommunications as well as corporate services.

Prior to his new assignment, Collins was vice-president of MIS, a position he held since joining Jefferson Ward in 1982.

Collins' association with retailing began in 1967, when he worked at Sears, Roebuck & Co., while attending the University of Miami.

After receiving his B.A. in psychology in 1972, Collins joined Jordan Marsh Co., Miami, and held positions in distribution and accounting. He subsequently advanced to director of selling systems.

In 1978, Collins became manager of store systems at Carter Hawley Hale Stores, Inc. of Los Angeles and two years later was named director of MIS at Fed Mart in San Diego, the position he held until joining Jefferson Ward.

NEWS

WEEK OF SEPT. 9

SEPTEMBER 10-11, BOS-
TON — **Fourth-Generation
Data Management Soft-
ware.** Contact: Software In-
stitute of America, 8 Windsor
St., Andover, Mass. 01810.

SEPTEMBER 10-11,
WASHINGTON, D.C. — **DBS
IV.** Contact: Seminar Regis-
tration, Phillips Publishing,
Inc., Suite 1200N, 7315 Wis-
consin Ave., Bethesda, Md.
20814.

SEPTEMBER 10-11,
HASBROUCK HEIGHTS,
N.J. — **Supporting and
Maintaining the Data Com-
munications Network.** Con-
tact: Data-Tech Institute, 386
Franklin Ave., Nutley, N.J.
07110.

SEPTEMBER 10-12, TO-
RONTO — **The Second In-
ternational Congress & Ex-
hibition on Computer
Security.** Contact: Interna-
tional Security Congress, 160
Duncan Mill Road, Don Mills,
Ont., Canada M3B 1Z5.

SEPTEMBER 10-12,
NEW YORK — **IMS Utili-
ties.** Contact: Sysed, Inc.,
One Park Ave., New York,
N.Y. 10016.

SEPTEMBER 10-14, MIN-
NEAPOLIS — **Structured
Programming Workshop.**
Contact: Yourdon, Inc., 1133
Ave. of the Americas, New
York, N.Y. 10036.

SEPTEMBER 10-14,
NEW YORK — **MVS JCL.**
Contact: Sysed, Inc., One
Park Ave., New York, N.Y.
10036.

SEPTEMBER 10-14,
PARIS — **The Sixth Interna-
tional Congress of Cyber-
netics and Systems of the
World Organization of Gen-
eral Systems and Cybernet-
ics.** Contact: Association
Francaise pour la Cyberneti-
que Economique et Tech-
nique, 156 Blvd. Pereire-F.
75017, Paris, France.

SEPTEMBER 10-14, BOS-
TON — **Structured Analysis
and System Specification
Workshop.** Contact: Your-
don, Inc., 1133 Ave. of the
Americas, New York, N.Y.
10036. Also being held Sept.
10-14 in Houston.

SEPTEMBER 10-14,
WASHINGTON, D.C. — **Op-
erating Systems for Micro-
computers.** Contact: George
Washington University, Con-
tinuing Engineering Educa-
tion, Washington, D.C.
20052.

SEPTEMBER 10-14, AN-
AHEIM, CALIF. — **Struc-
tured Design for Real-Time
Systems.** Contact: Yourdon,
Inc., 1133 Ave. of the Ameri-
cas, New York, N.Y. 10036.

SEPTEMBER 10-14,
NEW YORK — **Data Base
Development Workshop.**
Contact: Learmonth & Bur-
chett Management Systems,
Inc., Suite 405, 2800 N. Loop

W., Houston, Texas 77092.

SEPTEMBER 10-14,
PHOENIX — **Project Plan-
ning and Control Workshop.**
Contact: Yourdon, Inc., 1133
Ave. of the Americas, New
York, N.Y. 10036.

SEPTEMBER 10-14,
HOUSTON — **MVS/SP &
XA.** Contact: Computer Sys-
tems Research, Inc., 40 Dar-
ling Drive, Avon, Conn.
06001.

SEPTEMBER 10-14,
CLEVELAND — **Structured
Analysis and Design Work-
shop.** Contact: Yourdon, Inc.,
1133 Ave. of the Americas,
New York, N.Y. 10036.

SEPTEMBER 10-14, AT-
LANTA — **Structured De-
sign Workshop.** Contact:
Yourdon, Inc., 1133 Ave. of
the Americas, New York,
N.Y. 10036.

SEPTEMBER 11-12,
DALLAS — **Integrating the
Mainframe and the Micro in
the Corporate Environ-
ment.** Contact: Institute for
Advanced Computing Tech-
nology, Suite 108; 1433 Santa

Monica Blvd., Santa Monica,
Calif. 90404.

SEPTEMBER 11-13,
DALLAS — **Midcon/84
High-Technology Electron-
ics Exhibition and Conven-
tion.** Contact: Electronic
Conventions, Inc., 8110 Air-
port Blvd., Los Angeles,
Calif. 90045.

SEPTEMBER 11-13,
DALLAS — **Data Base Ad-
ministration and Data Re-
source Development.** Con-
tact: Software Institute of
America, 8 Windsor St., An-

dover, Mass. 01810.

SEPTEMBER 11-13, BOS-
TON — **Electronic Imaging
1984.** Contact: Electronic Im-
aging 1984, Morgan-Grampi-
an Expositions Group, Two
Park Ave., New York, N.Y.
10016.

SEPTEMBER 11-13, AR-
LINGTON, VA. — **Voice In-
put/Output Systems Appli-
cations Conference 1984.**
Contact: Association of Voice
Input/Output Systems, P.O.
Box 60904; Palo Alto, Calif.
94306.

NEWS

SEPTEMBER 11-13, DALLAS — Mini/Micro Midwest-84 Computer Conference and Exhibition. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

SEPTEMBER 11-14, LOS ANGELES — Unix Systems Expo/84. Contact: Computer Faire, Inc., 181 Wells Ave., Newton, Mass. 02159.

SEPTEMBER 11-14, WASHINGTON, D.C. — Distributed Processing: Mini and Microcomputer Implementations. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Boston.

SEPTEMBER 11-14, WASHINGTON, D.C. — Data Communications. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in San Diego.

SEPTEMBER 11-14, LOS ANGELES — Designing Real-Time Systems: A Hands-On Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Washington, D.C.

SEPTEMBER 11-14, WASHINGTON, D.C. — Designing with 16-Bit Micros. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. Also being held Sept. 18-21 in Los Angeles and Sept. 25-28 in Long Island, N.Y.

WEEK OF SEPT. 16

SEPTEMBER 18-19, WASHINGTON, D.C. — Mortgage Banking Automation Workshop and Computer Expo. Contact: Director of Registrations, Mortgage Bankers Association of America, 1125 15th St. N.W., Washington, D.C. 20005.

SEPTEMBER 18-21, SAN DIEGO — Implementing Local-Area Networks. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Washington, D.C.

SEPTEMBER 18-22, JAKARTA, INDONESIA — Business Indonesia — The International Business and Office Equipment Exhibition. Contact: Elizabeth Sillars, Overseas Exhibition Services, 11 Manchester Square, London W1M 5AB England.

SEPTEMBER 19-20, UNIONDALE, N.Y. — Dbase II. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 24-25 in Los Angeles and Washington, D.C.

SEPTEMBER 19-20, NEW YORK — The Association of Field Service Managers (AFSM) Future Trends in Service of Electronic Products Seminar. Contact: Thomas M. Ross, AFSM, Suite B, 6237 Presidential Court, Fort Myers, Fla. 33907.

SEPTEMBER 19-21, PHILADELPHIA — Networking & Data Communications for Personal Computers. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Sept. 24-26 in Costa Mesa, Calif.

SEPTEMBER 19-21, WASHINGTON, D.C. — Systems Analysis and Design: Concepts and Effective Practice. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

SEPTEMBER 19-21, ST. LOUIS — Introduction to Vsam for OS/VS System Programmers. Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

SEPTEMBER 19-21, CALGARY, ALBERTA — Network Communications Protocols. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

SEPTEMBER 19-21, SAN FRANCISCO — Unix. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

SEPTEMBER 20-21, WASHINGTON, D.C. — IMS/VS DB/DC Concepts. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

SEPTEMBER 20-21, CHICAGO — Data Communications: Advanced Concepts, Products and Services. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

EDITORIAL

What's to stop IBM now?

Two important and undeniable forces prevailed in the recent settlement of differences between IBM and the European Economic Community: the sobering economic realities of Western Europe and the awesome market power of IBM, power that has now defied the leveling efforts of the strongest governments in the free world.

Taken together, those forces produced the only plausible result of the EEC's lengthy investigation of alleged antitrust behavior on the Continent. And that result, while preserving the EEC's integrity, will do virtually nothing to limit IBM's ability to dominate Western Europe, more effectively, perhaps, than the company dominates the U.S. market.

Consider first the economic realities. Word from Western Europe, as recently as late spring, was that the EEC was preparing some tough sanctions geared to curb IBM's de facto market rule. Further rumblings from the EEC in Brussels suggested that efforts to compromise had largely failed, that IBM was an unmovable object in the path of a more competitive market.

The company's response was simple and direct. John Opel, IBM chairman, in a speech in London in May, suggested that IBM always had the option of taking its multi-billion-dollar Western European investment elsewhere should the business climate there turn inclement.
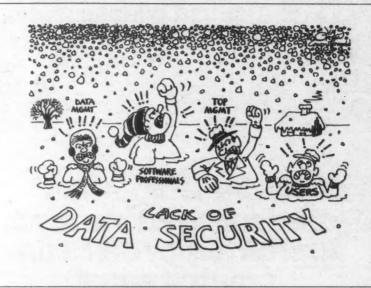
The EEC had to consider three ramifications of Opel's statement: 1) IBM employs nearly 100,000 people in 25 plants and research centers in the 10 EEC member countries; 2) IBM's European facilities churn out $11 billion-plus worth of annual output — mostly for European consumption; 3) Western Europe's recovery from the most recent recession is painfully slow. The EEC decision reflects its choice of political and economic concerns over matters of antitrust. It is also noteworthy that the most vociferous plaintiffs in the EEC matter were two U.S. companies, one of which — Amdahl Corp. — is half owned by Japanese interests.

The other undeniable force, IBM's market power, was best illustrated by the final terms of agreement.

Essentially, IBM relinquished very little and is now much freer to assume greater control than it previously had of a geographic market that has more potential growth than even the U.S. market. As it is now, IBM garners nearly 10 times the revenues of its closest European competitor, CII-Honeywell Bull of France.

In particular, the early disclosure of technical information to which IBM agreed will deviate a couple of months, at most, from the accelerated schedule of disclosure now followed, given the rapid pace of technological change in the mainframe business. Besides, IBM can announce new products whenever it chooses, maintaining an option to hold back an announcement a month or two longer than it would in the absence of a disclosure agreement. Being as dominant in the marketplace as it is, IBM will suffer little, if at all, in doing so, especially if it means protecting its competitive edge.

It all adds up very positively for IBM. The specter of antitrust litigation has been struck down in the U.S. and Europe — markets representing 75% of IBM's business — and will not very likely be raised again for some time. Whether this bodes well or ill for the rest of the computing community is hardly moot. If the governments of the Western World can't argue, who can?

But nobody does anything about it.

LETTER

Civil bankruptcy vs. criminal case

The article "Mob flexing computer muscle to streamline operations" [CW, July 23] left the mental equivalent of a bad taste in my mouth. There is no valid comparison of a civil bankruptcy hearing and a criminal case.

The framers of the Constitution may not have anticipated electronic data bases, but they had plenty of experience with bad laws. To put it simply: If a lawyer cannot convince a jury of intelligent laymen that a crime has been committed, then that case is not ready for trial.

The article might be read to imply that our law enforcement system needs other interesting innovations to equip properly it for witch-hunts: no-knock warrants for data base searches, for one, and (apparently) some well-armed Feds to gun down the hapless operator who is standing at the console when they come to call. (After all, how else can investigators capture a data base that is rigged to self-destruct at the touch of a button?) If it's all the same to you, I'd rather take my chances with the Mob.

Kevin Martin
Ramsey, N.J.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

VIEWPOINT

'Road Warrior' rides again

LECHT ON SCIENCE
Charles P. Lecht

What a relief! After 50 years of dealing with pencils, I've laid mine to rest in favor of my word processing personal computer to aid me in my race against each deadline. I "crashed" after seeing the Australian film, *Road Warrior*; it provided me with an image of myself as a word processing operator with which I could deal. My newly acquired machine was dubbed "Trans-Am."

I wouldn't have abandoned pencils even if it had been possible to do so in my earliest years (which it wasn't) since I, like other babies, got the kind of pleasure chewing pencils that a keyboard could never give. And in my school years, I wouldn't hear of using a keyboard — then found only on a typewriter — to bang out whatever; I was convinced that the medium pandered to teachers too lazy to decipher earnest handwriting attempts and sapped destined-to-stardom writers like myself of their creativity as they were caused to yield to the typewriter's electromechanical production demands. These, in their heyday, were enough to give the least fastidious writer a nervous breakdown as he torturously dealt with erasures, cross-outs and fingerprints while creating black cavities and white mounds — if not holes — on otherwise flat paper; the horror of retyping the whole thing was enough to make a person choose instead to do hard labor on a rock pile. That may be why, until word processors came along, so many secretaries killed their bosses.

Like the slide rule that was never made by an engineer, the typewriter was never made by a writer (although you'd have thought so by the

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

likes of the flattering image society has thus far conferred on its user). And like the slide rule, whose fate it was to be suddenly and utterly discarded — not even phased-out gracefully as was the horse and buggy — the typewriter is being rapidly abandoned as people realize that word processors correct most of its more onerous deficiencies while increasing its powers.

> *Like the slide rule, whose fate it was to be suddenly and utterly discarded, the typewriter is being rapidly abandoned as people realize that word processors correct most of its more onerous deficiencies while increasing its powers.*

Word processors will finally put the overvalued typewriter in its (rightful) place — that of the Gutenberg press. Owners of these were never mistaken for writers, so the problem of writer identification will be cleared up. Taking the typewriter's place in our lives, that is, the lives of people who used them at all (which doesn't include me), or the pencil's place for antitypewriter folks (which does), the word processor has made even old holdouts like me fall victim to its productive charm.

Keying into a mistake-forgiving word processor provides incredible r-e-l-i-e-f to the mistake-prone typist; he can now put to paper the message he wants rather than the one that he didn't want to erase. Kids are now freed from being judged on the neatness of their typewritten work; whatever their typing skill, the finished product can always be made to look flawless. No longer need secretaries worry about retyping the boss' creative whim-

sy of the day; changes are easily entered without screwing up the previous stuff. And talk about clean copy!

As you may have concluded, I am ecstatic over the fact that I gave up my pencil and started using a word processor. Before this event, I was forced to communicate my wishes on what to do with my manuscripts to a series of typists who themselves had taken the big step of abandoning the contraptions to which they owed their livelihoods for many years. Smug in the knowlege that I hated typewriters and secure that I would never sit doing what I am doing now, they had me by the tail, if you know what I mean.

"He'll never key anything," they reasoned. America's executives will all get their *own* coffee first — I had others do both for me for 25 years and got spoiled. Besides, I was known to be against "milking machines" of any type. On a visit to merry old England some years ago, I heard a dairy farmer talk of his disdain for milking machines; this was based upon his sworn witness, after using these machines, to a reduction in the cream content of his herd's milk. He attributed this to bovine depression induced by a cow's loss of its master's touch and the loss of occasions of intimacy like those involving an occasional slurp of his neck with her tongue. While admittedly a bit hard to swallow, it's not difficult to sympathize with the spirit of the farmer's message as it pertains to us; compare the words whispered to a person we love with those issued to a machine (however we may love it). If they are the same, we're deep in the proverbial stuff known best by farmers out standing in their fields.

So, dear readers, until the last few essays in this newspaper, I wrote everything I published by hand, using the instrument I had grown to know so well — my trusty pencil — if I wrote at all, that is.

That all this led my friends to conclude that I'd never actually enter my own work on a keyboard is understandable. Some knew that I had better things to do with my fingers than keying while

The answer to confiscation of traveling portables

HUMAN CONNECTION
Jack Stone

Fit to be tied, I was. And you would be too if you were halfway out the door headed for Mexico, psyched to perform possibly the greatest single field test of a computer since "Land ho" validated the abacus. There I was, all set to prove the efficacy, utility and performance functionality of the kneetop computer (formerly known as the lap or notebook computer) in the torrid, subtropical jungles of the Yucatan, when my confidant from the Mexican Tourism Council sadly related that there was no way my Teleram Computer Corp. portable — designer's case and all — would make it past the sharp-eyed customs agents.

You might wonder why I didn't obtain some sort of import license to bring my little beauty across the border. Good question, that. My confidant had also told me earlier that it takes about six months to obtain one from the Mexican government "if you're lucky," and even with the license, there was no ironbound guarantee that some teenage soldier outfitted with a tommy gun, glittering eyes and flypaper hands wouldn't be attracted to it. Even with my silver-tongued oratory, I'm not alto-

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

gether certain that I would want to debate the issue with him, at least not while his hands were fondling the trigger.

Calling all the intellectual and experiential resources that I could muster, I quickly concluded that without a machine, my test program would be rather limited. I already sensed the embarassment from imagining the letters to the editor of the "Annals of the Association for Computing Machinery," which would note the discrepancy in what was otherwise to be exquisite research on a critically important topic.

The one alternative

There was but one alternative. I had purchased a computer toy for my teenager, Adam, who is currently in process of, literally, clearing rocks away from his pathways to success. You see, while in his first year of college, through a part-time job, he serendipitously found his life's career: cutting grass. He is currently thinking about taking a few years off to plan the International Lawn Management Corp., and if it's successful, he'll skip college altogether.

Now, don't believe that I'm not proud of him, but in an attempt to encourage him toward other pursuits, such as the computer industry, I bought him a Radio Shack Corp. TRS-100 kneetop, replete with the new half-size cassette recorder and handsome black carrying case. With this background, my strategy for obtaining a machine was clear. I was merely going to borrow it from the kid while he was out communing with nature. He'd never miss it, I figured, as I was certain it was laying in a remote corner of his room, swamped by mud-

streaked equipment and numerous journals, magazines and books for grass-cutting freaks, with roaches, bugs and worms mucking all about. Which it was, they were and I did.

Now I'm not too much for the 100's functional capabilities or those of its competitors, like the NEC Corp. and Epson America, Inc. older notebooks, mainly because their word processing capabilities are a cut below the minimum I deem necessary to operate productively. For example, in the TRS, text entry is always done with the insert mode, which cannot be suppressed; the result is that no overstriking is possible, and you must delete all unwanted text! Further, you are forever scrolling back and forth to check out text since there are only eight lines showing.

Also, the product provides the world's simplest — but least capable — "data management" system. You can select records from string input, even finding uppercase fields from lowercase strings (wingy, dingy!). But that's all, and I mean ALL. No sort, no column rearrange, no global replace, no nuttin'. (Ergo, toy for the kid.)

Now if you are a perfect typist, have only small documents to prepare and are into telecommunications, the TRS-100 is just the portable machine for you. Or if you need a low-profile machine (read "miniscule coefficiency of confiscation") for a historic field test where tiny size and trivial weight are far more important than functionality, then the 100 is the right choice. Well, I did, and it was.

So I hauled the 100 and recorder out from their case, hid them amidst my shirts in my large suitcase and flew off to Cancun, Mexico. *To be continued.*　　‡

THE AT&T FAMILY OF DATASPEED

You need hardworking, multi-functional terminals dedicated to improving productivity.

AT&T Information Systems can help. We have a full line of asynchronous and synchronous data terminal products that enable you to move and manage information quickly. Products designed to get the word around.

Our DATASPEED® 4000 Terminals are engineered to get along well with people, too.

Non-glare, high-resolution, black background tilt screens, English language options, and lightweight detachable keyboards in typewriter format keep users comfortable and productive.

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Conversational and editing terminals that speak for themselves.

The DATASPEED 4410, 4415, 4420 and 4430 Terminals are asynchronous desk-top workstations with superior features and functionality.

The 4410 is conversational, with graphics and sophisticated display capabilities.

If you need an editing display terminal, the 4415 is one of the most functional in its class. The 4420 is a feature-rich editing display terminal. It's especially engineered to help the nontechnical user become proficient quickly.

The 4430 is a conversational terminal for the multi-point, private line environment. There's no need for the computer to poll and address these multi-point terminals. This saves you valuable processing time.

Synchronous terminals on speaking terms with IBM.

AT&T Information Systems' DATASPEED 4540, Enhanced 4540 and 4540 Touch Screen Terminals are designed for a clustered, polled environment. All of these synchronous terminals are compact, modular and 3270 compatible.

TERMINALS. WE SPREAD THE WORD.

The 4540 and Touch Screen 4540 support SDLC/BSC line protocols. With one of our new controllers, you can upgrade to SNA by simply changing a diskette.

For SNA/SDLC compatability, there's the Enhanced 4540. It offers flexibility, introducing a choice of two controllers, standard- or reduced-sized displays and high- or low-profile keyboards.

The Touch Screen 4540 has 30 touch-sensitive areas on the screen which give you fast, easy access to information.

A history of communicating better.
AT&T led the communications revolution over 100 years ago. Our products and service set the standards for performance and reliability.

Today, 4,000 scientists from Bell Laboratories are working full time to develop and design new business products at AT&T Information Systems Laboratories. Products we continue to support by the largest, most experienced sales and service force in the industry.
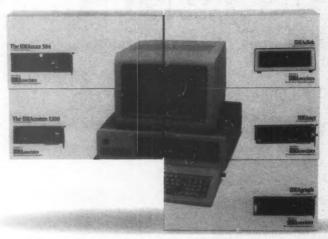
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WHEN YOU'VE GOT TO BE RIGHT.

AT&T
Information Systems

VIEWPOINT

LETTERS

Unrealistic views

Jack Stone's "DP aspirants with unrealistic expectations" [CW, July 9] hit several responsive chords here. I am a professor of computer science at a four-year college that has had an undergraduate computer science major for 18 years. It has been the experience of our department that our job has gotten harder since we started getting freshmen with high school computer experience. We have found that students without such a background are generally the better students by the end of the first semester.

The reason for this is the poor quality of high school instruction in computer science, which is a result of the unrealistic view toward computer science of many administrators and teachers. It has been my experience that administrators expect teachers can be "converted" into computer scientists by giving them a course in Basic, frequently taught by someone whose background is not much stronger than their own. And many teachers, not knowing better, find no problem with this attitude.

I am afraid that computer science has become just another educational fad and that little will be done to see that it is done right. The result will be that many students will be turned off to computer science, just as many were turned off to mathematics by the educational system's poor implementation of "new math" two decades ago. Even now, students are coming out of high school thinking that computer science consists of "language collecting" and do not expect the rigor and emphasis on problem solving they discover in college.

Computer science is hard. Our schools must stop teaching that it is not. Only then will there be hope of ending the unrealistic expectations of the general public.

Michael P. Conlon
Potsdam, N.Y.

Garbage lives forever

"Service bureau: slap in the face?" [CW, July 9] merely illustrates a heretofore unnamed law of absurdity, namely: The life expectancy of a system is inversely proportional to its quality. Restated: Garbage lives forever.

I've seen this law at work many, many times, with and without service bureaus in sight.

Bruce R. Lerner
Reno, Nev.

Video game advantage?

With regard to "College tries computer camp for girls only" [CW, June 25], I can only hope that Dr. Markita Price was misquoted in the statement "... the popularity of video games among junior high school boys gives them the edge when it comes to learning how to run computer systems."

Video games are popular among junior high students and do not afford those who use them an advantage when learning to run real computer systems. Computer camp for girls

only might be a fine idea, but not because they have limited experience with video games.

Jeanne Kellogg,
Hamilton, N.Y.

Footnoting response time

Since we have been investigating the advantages of subsecond response time for the past 18 months, I'd like to add a footnote to Lawrence J. Kosmatka's "A user challenges value of subsecond response time" [CW, June 11].

Like Kosmatka, we have confirmed the existence of "Thadhani's curve" and share his skepticism, although for a different reason. Our measurements indicate that when system response time gets down to a small enough value — somewhere

around .25 second — the dependent and independent variables reverse.

In this way, we can explain our observation, at 900 transactions per hour, of the highly unusual internal system response time of .05 second.

In short, our measurements suggest that interpretation of the Thadhani curve is valid for internal response times down to approximately .25 second, but that increased transaction rates are of dubious interpretation below that point.

Michael L. Coleman
Pittsburgh, Pa.

Advertising copy?

Even though a little late, I must respond to the In Depth "Turnaround management" [CW, April 9]. Although some of Joseph Izzo's com-

ments regarding poor data processing departments certainly have a great deal of truth in them, I felt that the article amounted to well-written advertising copy for Izzo's company.
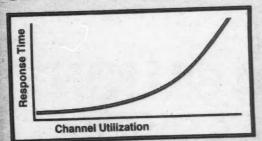
In cases of poorly run departments, if a competent DP manager can be brought in and given the top management commitment required and discussed by Izzo, a dramatic turnaround can be accomplished without the requirement for any external consultant's involvement.

Many of the advantages attributed by Izzo to his company's "turnaround management" could be refuted on a point-by-point basis. I am surprised that *Computerworld* would run a piece that so closely resembles a management-oriented proposal to hire the services of the author's company.

Richard K. Fox
Bear, Del.

VIEWPOINT

Manufacturing systems: justifying the investment

READER'S PLATFORM
Daniel J. Sitler

The March Special Report [CW, March 26] would tempt anyone into opting for more flexible manufacturing systems. Every manufacturer would like to get the most out of his hourly wage and capital investment dollars. However, the unfamiliar and costly nature of integrating numerical control machinery, robotics and automated material transport systems makes such investment difficult to justify.

One of the major concerns in creating flexible manufacturing systems is the cost of the computer hardware and software required to support complex operations. For example, the cost of programming a robot to pick a workpiece from a bin and properly orient the piece for machining is very high when the pieces are put in the bin at random. This cost could be considerably reduced by using measurable containers, similar to egg cartons, to hold the pieces. Programming a series of incremental movements, rather than a blind search and grab, would involve far fewer conditions for the programmer to take into account.

Another concern when producing great numbers of parts in complete automation is the possibility of producing a large quantity of parts out of tolerance. Modern numerical control systems often include adaptive control, so when a bad part is caught by the gauging mechanism, the machine tool control is corrected to produce the next part within tolerance.

However, if the correction is too wide, it is possible that one part will be too big, the next too small, the next too big and so on. The purchaser of an adapative control system should be sure that such an event is precluded by the software involved in the adjustment.

The collection of shop floor data is one area in which flexible manufacturing systems excel in providing inventory and attendance information vital to cost-effective plant operation.

Numerical control equipment can also provide the corporate mainframe with data on operator and maintenance personnel errors. Information on operator errors can be used to improve the instructions and procedures that are used on the shop floor. Such improvements can have cost benefits in higher productivity, reduced scrap and longer machine life.

Tracking maintenance errors can also improve procedures that keep machines from being used when the consequences would be tragic and expensive, such as running without lubricant or with open maintenance.

Machine wear

Using feedback data on machine and tool wear is another normal function of current machining equipment. This data is vital to the machine's adaptive control and the manufacturing system's maintenance and repair effort. Wear and breakage records should include the vendor's name, the machine type and the serial number. For tools, the spindle, tool type, number and purchase price should also be included. This information should be analyzed regularly to determine which vendor delivers the most cuts per dollar and to isolate capital absorption areas in the manufacturing system.

One component that does not have a counterpart in nonautomated systems is the cabling required to hook machines together in a local-area network. Environmental local-area nets are used in controlling temperature, humidity, lights and building security. Products that need controlled temperature and humidity would be cheaper if the environment and manufacturing local-area networks were shared.

Shop floor data, such as the types suggested above, is only of value if it can be analyzed on the corporate mainframe. Management should insist that the manufacturing resource planning (MRP) software running on the mainframe accept data directly from the numerically controlled machines. This will save the cost of user data conversion programming and ensure that the mainframe data base is always current. If necessary, MRP II software vendors should meet with flexible manufacturing system designers and arrive at standards for passing the various classes of data between the two systems.

Independent software companies and smaller numerical control equipment producers may have little incentive to participate in this process. However, they should know that large companies that make manufacturing hardware and software will feel no compunction in making their competitors' systems obsolete by de facto standardization. ‡

Sitler is a senior software programmer with Hobart Corp. in Corington, Ohio.

VIEWPOINT

How strong a shield are vendors' form contracts?

READER'S PLATFORM
Jeffrey A. Miller

In "Standardized contract clauses: winning battles, losing the war" [CW, July 2], Christopher Mislow asserted that computer manufacturers can effectively shield themselves against legitimate user claims by legalese contained in standard form contracts. This seriously misstates the current state of the law.

Without question, most computer purchasers are required to sign contracts replete with clauses that purport to limit the buyer's rights. Reduced to ordinary English, the typical purchase contract reads something like this: "We promise absolutely nothing about what our computer is capable of doing, and, in particular, we do not promise that the computer will operate the way that our sales literature and salesman told you that it would. And if, for some reason, some court somewhere should decide that we did promise you something, then you waive all right to monetary recovery for our failure to live up to our promise."

As an attorney who has represented numerous users in lawsuits against giant computer vendors, I can attest to the fact that the courts generally find such clauses as unfair as most readers and will lean over backward to deny effect to them. While there are cases in which the manufacturer has escaped liability based on form contract clauses, in the majority of reported cases, the purchaser has prevailed on one theory or another despite the purchase contract.

Proving fraud

The most effective, but by no means the only, method of overcoming clauses that seek to limit the purchaser's rights is to assert and prove fraud. I know of no jurisdiction that allows a vendor that has lied about its products' capabilities to shield itself behind contract provisions included in its own form contract. Even where the contract contains a clause that purports to disclaim any promise or representation concerning the product, the courts will generally allow the buyer to recover.

Fraud claims appear to be particularly common in the computer field because many, if not most, disputes involve exaggerated sales claims and overselling of system capacity. Many other claims arise from the manufacturer's being in such a rush to get to market that he sells the project before it is ready, without bothering to disclose that fact to the purchaser. The purchaser who has become an involuntary test site generally will be allowed to recover.

Even where there is no provable fraud, there are a number of ways in which courts will defeat the effect of the seller's form contract. Therefore, at least in California, it is highly questionable whether a purchaser will be barred from recovery, regardless of the vendor's misconduct.

Miller practices law with Perez McNabb & Cook, an Orinda, Calif., firm that represents purchasers in purchaser/vendor disputes.

Texas law is, if anything, more favorable to a computer purchaser than is California's. Under a consumer protection statute that applies to business purchasers as well as individual purchasers, a misrepresentation concerning the capabilities of a product will overcome any contract clauses limiting recovery even if the vendor did not intend to deceive the buyer and had no reason to know that what he was saying was wrong. While the law in other states is not always as favorable as it is in California and Texas, it is very far from being uniformly favorable to the large computer manufacturer.
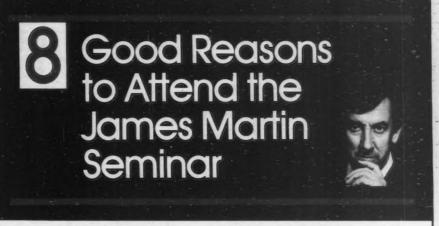
Other means of overcoming the seller's fine print protective clauses may apply depending on the facts of individual cases. For example, most standard form contracts contain a clause limiting the buyer's remedy for the seller's breach to repair or replace the defective product. A long, if not unanimous, line of cases holds that where there is such a clause, and the seller fails to repair or replace the offending project, then he will be liable for the purchaser's damages, including lost profits, even if the contract specifically excludes recovery for lost profits. Where the seller fails to live up to his part of the bargain, then most courts hold that he loses the protection of his "no lost profits" clause.

Many other means of overcoming the form contract clauses may be available. Keep in mind that the courts do not like these clauses and will lean over backward to ignore them when the user asserts that they should not apply. I agree with Mislow, however, that reliance by manufacturers on such clauses is shortsighted in an industry where ultimate success will be measured in terms of satisfied customers, not successfully defended lawsuits. But I cannot subscribe to the blanket proposition that form contracts effectively provide legal protection to computer manufacturers. ‡

ROAD

talking; others suspected that I was too lazy or too old to learn, but that impression was dispelled when they witnessed the struggle I went through, insisting on utilizing traditional handwriting and communicating with several ornery typists to get each essay done. Can you imagine their shock when I acquired a personal computer and started to use it, word processing software and all? And that I actually liked doing it? They flipped!

I became an instantaneous convert to using a word processor when I discovered, quite by accident, that it was fun; more fun than playing Space Invaders, Pac Man or Donkey Kong. And much more fun than talking anyone into staying late to turn out "just one more draft."

The version I'm using now has more screen action than just about any video game; especially if you're an amateur. With messages popping up all over, a smorgasbord of mysteries present themselves in such a way that most adventure games pale by comparison.

True, I yielded to keyboard usage, but all of life involves compromises of one kind or another. Besides, I am convinced that voice entry of text is around the corner for writers — especially for those with limited vocabularies.

Small price

Anyway, keyboarding is a

Keyboarding is a small price to pay for the benefits received. My word processor is better at spelling and grammar than most people I've encountered.

small price to pay for the benefits received. My word processor is better at spelling and grammar than most people I've encountered; it learned to do what it does as flawlessly as is anything done in this world, and why not? It's like having a convention of bespectacled English teachers editing your theme before you turn it in so you'll always get an 'A.' And it doesn't gripe about my ungodly sentence constructions or the words I use.

These thoughts consume me as I sit for today's session with my word processor. It's 7 p.m; I've now done over 40 essays in *Computerworld*, and the next is due tomorrow, " 'Road Warrior' rides again" I'm partially done now and feel the pressure of my deadline steadily growing. Can't let the copydesk down. I vow to have the next one done early, a vow that I've now made over 40 times.

I, now Road Warrior, turn on my word processor "Trans-Am." Shifting smoothly through the opening sequences and accelerating to edit mode, I head for the sunrise hell-bent on hitting pay dirt — or else it's curtains for copydesk.

Cruising along, I begin to respond to a set of terse requests for information, and lots of it — time, date, directions on how I want my output treated and the Lord only knows what else. It appears to be giving me a test, one programmed by a wicked typing teacher who resents anyone who types poorly.

I give it the command to bring up my file and stop horsing around. "Road Warrior hasn't got time for tutorials today," I shout: Whacking away at the keyboard, "Trans-Am" glides over my text — flawlessly absorbing the shock of its presentation.

Suddenly it starts to sense malfunction in its tiring driver; it's way past midnight. It discovers that I'm having trouble formatting and starts preaching the rules until I think I've gone mad.

"Ye gods," I gasp, "it knows I'm lost and desperate for direction." I key with a passion: "Help, help, help!" A stern message appears on the screen telling *me*, Road Warrior, the rules for help and points out that once is enough. Then in front of my eyes, the screen starts to scroll my text, correcting my lousy spelling, making paragraphs, restructuring my grammar, even rewriting parts of my work.

Thereupon, it issued a massive dose of artificial intelligence; all that any system could bring to bear

bathed me and my work in a green phosphor glow. I bowed my head in prayer — for the salvation of my work and its ultimate communion with *Computerworld* in Framingham, Mass., before deadline.

When the sun rose, "Road Warrior," riding a floppy five and a quarter, cruised around for a while in "drive," waiting for me to figure out how to energize

my word processor's outboard modem so it could make the last leg of its journey.

After I place the telephone in the modem's cradle, "Road Warrior" decomposes into atomic particles and streams from my New York office to *Computerworld*'s in a breathless race with deadline.

Think of the joy when confirmation comes from copydesk: "Road Warrior" has arrived and is on its way to print. Slumping with exhaustion, I slowly shut the system down — modem, processor, printer, tube and all. It blinks "Good morning," and I pat it goodnight.

SOFTWARE & SERVICES

IBM VM gets control package

VIENNA, Va. — Software for control of system and operations resources of the IBM VM environment will be made available in September by VM Software, Inc.

The software, VMcenter, is a "comprehensive package to streamline operations, manage system resources and protect data" in such data centers, according to Bob Cook, VM Software's chief executive officer. VMcenter was reportedly designed to control such areas as disk space management, system security, accounting and auditing, work load management and operations.

To allocate disk space better, VMcenter reportedly lets users determine their own space requirements and match them with assigned disk pools. The technique reportedly keeps data center management in complete control of disk storage.

VMcenter is also said to simplify tape processing for operators and users through its device, retention and volume controls. Tape drives are automatically allocated as requests are issued, VM Software said, and tape volumes become available automatically as they expire. Tape volumes are said to be protected through verification by standard labels.

Under VMcenter, tasks such as backups, periodic accounting and spool purges reportedly can be set by operations management to run automatically at off-peak times. VMcenter also allows users to control scheduling of their own work and offers system administrators control over access to resources.

VMcenter is priced at $27,500 from VM Software at Suite 355, 2070 Chain Bridge Road, Vienna, Va., 22180.

Genesys offers integrated HRMS for IBM systems

LAWRENCE, Mass. — Genesys Software Systems, Inc. has announced an integrated human resource management system (HRMS) for IBM mainframes in the IBM OS and DOS environments.

According to a spokesman, the HRMS — dubbed Genesys — operates in conjunction with IBM's IMS data base management system and includes Genesys Software Systems' All-Screen utility software for customization of the package.

It also includes benefits, personnel and payroll accounting modules.

Each application is accessible on-line, and users can expand the integrated employee record files for benefits, personnel and payroll to reduce data redundancy and errors due to duplicate entries, according to a spokesman.

The system's Benefits Management, Personnel Administration and Payroll Accounting modules may be purchased separately for later integration.

The Personnel Administration module offers a master file design with a two-tier data base structure for individual and group records, and it features unlimited record keeping capabilities for compliance with changing government regulation and reporting and for in-house services, the vendor said.

The system's Payroll Accounting module features exception-oriented processing and addresses the payroll requirements of large, multidivisional organizations, the spokesman said.

The complete Genesys HRMS package is priced at $300,000, and individual modules range in price from $50,000 to $110,000.

Additional information is available from Genesys Software Systems, which is located at 20 Ballard Way, Lawrence, Mass. 01843.

■ Data Design Associates, Inc. has announced a capital project management system for a variety of large computers/**58**

■ Hewlett-Packard Co. is offering IBM System/34 users a migration path to the HP 3000/**58**

■ An IBM MVS diagnostic service has been announced by Morino Associates, Inc./**58**

■ An on-line data base of more than 52,000 software packages is available from Menu/**60**

■ Digital Equipment Corp. has added two word processing packages to its line of VAX-11 software/**66**

INSIDE

Expense? Asset? R&D debate goes on

SOFTALK
Paul Gillin
CW Senior Editor

Consider the scenario: Outerware, Inc., a software vendor, has spent two years and $5 million developing a revolutionary software package. During that time, the company has written off its research and development costs as an expense and, as a result, has suffered massive losses — no product, no sales.

Now, just as the coding is 90% complete, Outerware runs out of money and has to go to a bank for more. The banker takes one look at the company's income statements, chuckles quietly and goes out to lunch.

On paper, the start-up company is losing big money, but in reality it has the potential to make big profits. The only difference is in the procedure it uses to account for R&D costs. Industry standards now require most software firms to expense those costs rather than capitalizing them as assets. This means that software companies write off the costs in a single year rather than depreciating them over a longer term.

While this succeeds in reducing or eliminating a company's tax burden during stages of intensive R&D, it also can make the bottom line of a small firm "look like a roller coaster," according to John MacKinnon, a partner at the accounting firm of Price Waterhouse & Co. in Boston.

Over a period of years, even a small
See **R&D** page 74

SOFTLINE/LES GILLIAM

Diversity, not intensity, the best approach to staff motivation

Most information systems managers are under significant pressure. With a limited staff, a restrictive budget and deadlines that keep closing in, the manager's tendency is to take a shortsighted approach and call for a nose to the grindstone response from the staff. In so doing, he may expect to see an increase in employee burnout, a loss of enthusiasm and the creation of software hermits.

Software hermits are those people whose activities are limited to a very narrow scope, who are never exposed to new ideas or new technology and who will, over time, become lethargic and lose their creative spark.

The wise manager will take the longer range viewpoint of developing his staff to its greatest potential

Gilliam, an independent consultant based in Ponca City, Okla., is a regular contributor to Softline.

by providing challenging work as well as the opportunity to grow. These opportunities often require the employee to get out of the rut and away from the office.

Shown below are seven ideas that the manager can use to provide motivation for his staff. All of these need not be applied to every staff member. Annual budgets of expense money and employee time should allow for a predetermined allocation devoted to one or more of these categories. This plan, which you can call training, education or personal development, should be carried out completely and not curtailed due to system deadlines or work load.

■ Field trips. There are many analyst/programmers today trying to design and develop a computer solution when they do not really understand the business problem. The analyst needs a first-hand observation of the people and environment in the user's business area. A tour of the user's factory, warehouse, store

or offices will go a long way toward providing the understanding necessary to develop a satisfactory solution. In addition, if the programmer can meet and talk with some of the end users who will be involved with the results of the processing, a significant motivational seed will be planted.

■ Users groups/industry meetings. There are hundreds of users groups associated with various vendors. These groups hold both local and national meetings to learn about the latest hardware and software technology and to discuss and address problems of mutual interest. Computer industry organizations also sponsor exhibits and presentations. Sending an employee to these types of sessions will not only increase technical knowledge, but will also allow him to rub shoulders with his peers in the profession and to gain new ideas and inspiration, which can be applied immediately to the challenges back home.
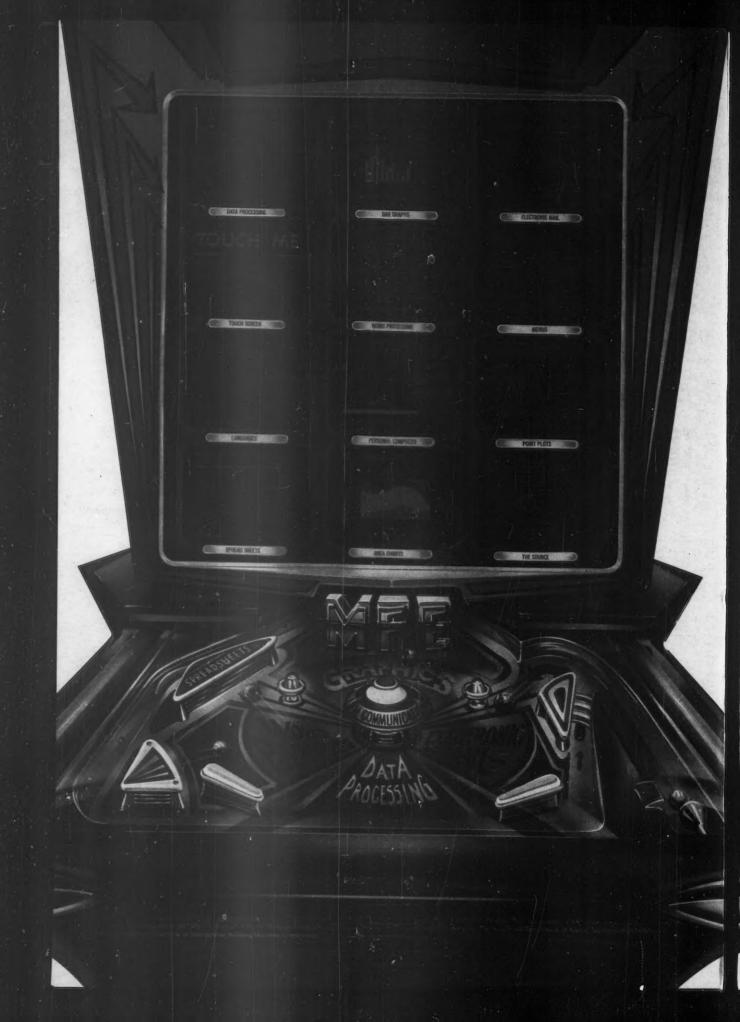
■ Seminars and classes. The rate of change in technology is overwhelming. You can choose to ignore it, but you may be missing out on ways to increase productivity greatly. You may also restrain your people from employing the newer tools of the trade, causing them to seek greener pastures or to hang around and grow complacent. Selectively enrolling employees of all levels in profitable learning opportunities is a sound investment.

■ Vendor presentations. Vendors continually seek ways to inform customers and prospects about their product lines. Local presentations of new products are an economical opportunity for some members of the software staff to broaden their visions. They will also see how a professional presentation is conducted, which, of course, is free education.

■ Visits to other companies. One of the most important ways to expose the software staff to new ideas
See **MOTIVATE** page 74

Data Design offers management system
Said to monitor progress of large expenditure programs

SUNNYVALE, Calif. — Data Design Associates, Inc. has announced the Capital Project Management System (CPMS) for use with a variety of large systems.

According to a spokesman, CPMS will monitor the progress of construction projects and other large expenditure programs to ensure that allocated funds are being properly spent within a budgeted framework.

It will function in an on-line, real-time mode on IBM 4300 and 30 series and larger processors and on Hewlett-Packard Co.'s HP 3000 line. It will also work in batch mode on large-scale processors from Burroughs Corp., Honeywell, Inc., Digital Equipment Corp., Data General Corp. and Sperry Corp.

The spokesman said that when a project or project phase is completed, CPMS automatically translates expenditure data into a fixed asset, in accordance with specific user instructions. The system features Data Design's Advanced Systems Architecture so that CPMS can integrate with the company's other financial systems. Included is a series of standard reports that can inform users of the amount each project phase is over or under budget.

The system can perform trial translations of expenditure data to fixed assets, enabling users to experiment with different cost combinations in establishing fixed asset values for depreciation purposes, according to the spokesman.

It can take a single expenditure, parts of an expenditure or groups of expenditures and combine them to make one asset, and it can allocate parts of expenditures to different components of a project.

CPMS is scheduled for shipment this fall. Prices begin at $15,000 from Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

HP unveils path from System/34 to HP 3000

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a product that can be used to migrate software from an IBM System/34 minicomputer to an HP 3000. After the change, IBM RPG programs run in native mode on the HP 3000 at least as fast as on the System/34.

Called HP Transform/3000, the product consists of three elements: upgrade utilities that bring over procedure and data files, a process monitor that speeds execution of a set of commands that performs System/34 functions on the HP 3000 and on-site consultation services.

The transfer is made possible by HP's Procmon process monitor. Procmon gives the HP 3000 System/34-like features, but without an emulator, the company claimed. Most recoding required by the migration is thus eliminated.

HP Transform/3000 runs on any HP 3000 equipped with the company's MPE operating system and the RPG compiler, either version 6.0 or later.

The migration process can be completed at a price of about $15,000 without interruptions in ongoing operations, a spokesman said.

HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

Morino unwraps MVS diagnostics

VIENNA, Va. — Morino Associates, Inc. has announced the MVS Problem Alert System (MVS/PAS), a diagnostic service designed to help IBM MVS operating system users avoid maintenance delays and increase system availability and capacity.

According to a company spokesman, MVS/PAS is an ongoing service that automatically validates IBM systems software maintenance levels to focus attention on significant software quality problems.

MVS/PAS is said to supplement the use of IBM software maintenance products, such as Info/MVS and the System Modification Program.

The spokesman said subscribers to MVS/PAS receive a current data base and a Software Maintenance Analyzer. Every two months, the data base is updated on the basis of the company's research and is sent to the user. The analyzer can then be used to produce maintenance reports.
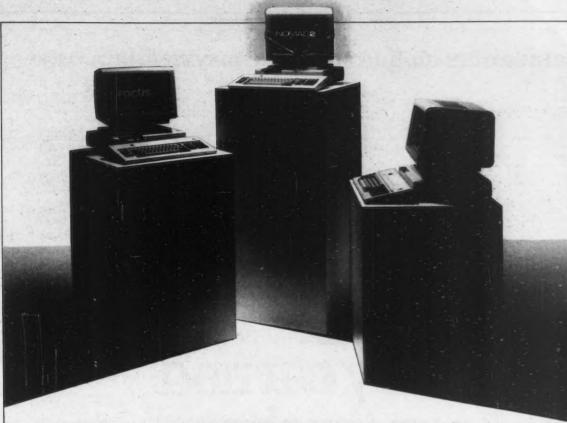
Data in the data base is collected from Morino's field experience, Info/MVS and the Early Warning microfiche.

An MVS installation uses the MVS/PAS Software Maintenance Analyzer to run installation maintenance data against the MVS/PAS data base.

The service is said to allow installations to produce various custom maintenance reports.

MVS/PAS can be licensed at an annual fee of $12,000 from Morino Associates, located at 8615 Westwood Center Drive, Vienna, Va. 22180.

SOFTWARE & SERVICES

Menu offers on-line software product data base

By Paul Gillin
CW Staff

FORT COLLINS, Colo. — Menu has announced an on-line data base service that is said to include descriptions of more than 52,000 software packages for use on mainframes, minicomputers and microcomputers. Customers can search the data base by calling the company or accessing the service through Dialog Information Services, Inc.'s Dialog service. Software can also be purchased through Menu, the company said.

By calling toll free 1-800-THE-MENU, customers can search for software with up to 16 keywords and receive a printout containing detailed descriptions.

Menu also optionally offers a printout of third-party evaluations. The search costs $25 for the first 10 programs located, $1 per program for the next 40 programs and 25 cents per program thereafter. If a customer purchases the software through Menu, the search fee is credited against the purchase price.

If Menu cannot locate the desired software, the customer's request is filed into a data base and the customer is notified as soon as a suitable program is found.

Software can be ordered through Menu at up to 25% below retail price. Delivery is usually within 10 days.

A spokesman at U.S. West, which is Menu's first large corporate ac-

count, said the regional holding telephone company chose the service for the size of its data base and its objectivity.

"It's a really dandy service," said Norman Lorentz, U.S. West's manager of market planning within the MIS department. "The Menu people know what's out there. They're also talking to users to find out how good the products really are."

U.S. West may eventually expand the program to include a large part of its more than 50,000 employees, Lorentz said. Each user will receive a Menu packet and an identification number. The corporation will pay for all business use of the service.

Lorentz noted that the MIS depart-

ment is likely to employ Menu in its own purchasing procedures for minicomputers and mainframes. "Right now, we use [Datapro Research Corp.] reports and others to find software," he said. "I think in the future we'll use Menu equally or more than those sources."

Menu is located at 1520 S. College Ave., Fort Collins, Colo. 80524.

Multilingual WP out for VAX-11

LOWELL, Mass. — Compuplex, Inc. has announced Multilingual Word Processing (MLWP), which allows a Digital Equipment Corp. VAX-11 series computer to complete word processing in a number of different languages.

Compuplex said that users can choose from more than 192 different languages, including French, Spanish, Hebrew, Russian and Portuguese. Help screens, prompts and error messages are displayed in the chosen language.

Users are able to run a number of different language word processing applications on one screen, Compuplex said. Languages read from left to right can be displayed with those reading right to left.

Prices for MLWP range from $7,500 to $100,000. For $7,500, the user receives word processing software in two languages that runs on a Microvax with 1M byte of random-access memory.

Additional languages are available for approximately $1,500 each. The $100,000 represents a complete turnkey word processing system that runs on the VAX-11 minicomputer.

Compuplex is located at 188 Middle St., Lowell, Mass. 01852.

Financial tool announced

AUSTIN, Texas — Execucom Systems Corp. has announced the Interactive Financial Planning System/Dimension (IFPS/Dimension) package for users of IBM mainframes under IBM's TSO and CMS and Prime Computer, Inc. processors.

IFPS/Dimension combines relational data base management (DBMS) facilities with a modeling and planning system. It is said to incorporate the design features and command syntax of IBM's SQL to allow users to perform inquiries using free-format, English-like commands to solve data-intensive problems.

The package is fully integrated with Execucom's IFPS financial planning system to give users access to all IFPS capabilities, including command files to automate systems.

The relational DBMS capabilities of IFPS/Dimension and the data handling facilities of IFPS provide various support capabilities. IFPS/Dimension is priced at $25,000 from Execucom Systems, 3410 Far West Blvd., Austin, Texas 78731.

DIGITAL DISPLAYS THE TERMINALS BEST ENGINEERED FOR BUSINESS.

Before you make any investment in business graphics terminals, it really pays to investigate what you'll be using them for.

If you're like most businesses, your terminals will be used approximately 70% of the time for generating text and numbers. And only around 30% of the time for strictly graphics purposes. The October 1983 *Infosystems* article, "How to Buy Graphics Displays," coauthored by Jim Warner, CEO of Precision Visuals, Inc.,® states, "While it may be true that one picture (chart, graph) is worth a thousand words, there will always be the need for words, thousands of words, in the day-to-day activity of the office. Special graphics-only devices can have limited value in a general office environment."
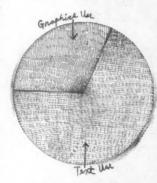
At Digital, the first step in engineering every product we make involves a thorough analysis of who will use it, what it will be used for and which features will help make people more productive in their jobs.

That's been true of every terminal we've designed and helps explain their widespread acceptance and popularity.

And you'll find it's equally true of Digital's latest entries, the VT240™ and VT241™ terminals.

ENGINEERED BEST FOR WHAT YOU NEED MOST.

As the newest members of Digital's family of terminals, the VT240, a conversational

Graphics Use

Text Use

text and graphics terminal, and the VT241, with the added

dimension of color, continue the tradition of engineering excellence for performance. They offer full VT100™ compatibility to take advantage of a host of offerings already developed. And to meet the needs of the business environment, you'll find a set of standard text features that are either unavailable on other terminals or may have to be purchased at an additional cost.

These features include bidirectional smooth scrolling, split screen, a choice of 80 or 132 columns per line and a double width/double height format. A highly legible 8 by 10 dot matrix character font displays true ascenders and descenders for exceptional crispness and legibility. If cer-

tain information needs to be highlighted, you can select from a combination of bold print, blinking and underlining in either normal or reverse video. For your added convenience, there's even a built-in printer port for printing hard copy.

Both the VT240 and VT241 terminals give you the option of erasing selected character positions on the screen for more efficient communications and increased productivity. For those applications that require data to be entered by filling in the blanks of a form, once the data has been accepted by the host, the filled-in information – and only that – can be erased by means of a single command. The form itself remains up on the screen and is ready to accept the next data entry sequence.

Beyond this remarkable range of text capabilities, the VT240 and VT241 clearly answer your graphics needs as well.

HIGH-IMPACT PRESENTATIONS IN GRAPHIC DETAIL.

The inclusion of a diagram, chart or graph in any report or presentation can immediately transform complex data into easily understandable information.

SOFTWARE & SERVICES

Xidak 'Structure Blaster' boasts universal data conversion facility

PALO ALTO, Calif. — Xidak, Inc. has announced the Structure Blaster, which is said to provide data portability across computing systems.

According to a company spokesman, the Structure Blaster works with a variety of computer systems, including IBM 370 series mainframes; Digital Equipment Corp. Decsystem-20s and VAX-1,1s; Apollo Computer, Inc.'s Domain; and Sun Microsystems, Inc. Sun workstations.

Structure Blaster provides a general high-speed I/O capability for complex data structures, and it supports data portability through a universal data conversion facility.

An alternative

The Structure Blaster is designed as an alternative to data bases, particularly when an application program requires storage and high-speed access to sophisticated data structures, the spokesman said.

Any data structure reportedly can be read or written to a file with a single procedure call, and the data structure can be changed without requiring any change in the I/O code.

The spokesman said that on output, the Structure Blaster traverses the entire structure and writes it into a single contiguous portion of a file.

Input operations

On input, the system allocates a single contiguous portion of memory, reads the data structure into memory with the fastest form of I/O available from the underlying operating system and relocates all pointers and string references, according to the spokesman.

The product writes all necessary descriptive information for the data structure to the file, allowing conversion of the data structure in one machine's format to that of another machine, the spokesman said.

Structure Blaster is scheduled to be available at the end of the third quarter, 1984, according to the spokesman. It is priced between $400 and $4,000.

Xidak is located at 974 Commercial St., Palo Alto, Calif. 94303.

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

LANDMARK SYSTEMS CORP.
Mantis support for the Monitor for CICS

Landmark Systems Corp. has announced that its Monitor for CICS now supports IBM CICS programs developed using Cincom Systems, Inc.'s Mantis fourth-generation programming language.

According to a spokesman, the Mantis support feature enables users to perform transaction reporting and accounting at the application level. Previously, all transactions under Mantis were identified by the same code, and users were only aware that a transaction was being completed. Now, the Monitor for CICS identifies for users what is being done and by whom.

The Monitor for CICS also supports Oxford Software Corp.'s User Files Online (UFO) system and the Development Management Systems (DMS) from IBM. The package allows reporting and accounting at the application level when used with Mantis, UFO and DMS.

Landmark also announced Monitor for CICS support for additional IBM systems, including MVS/XA, SSX and CICS 1.6 under DOS and CICS 1.6 and 1.6.1 under OS. Permanent licenses for the all the systems are priced at $6,500 for DOS and $13,500 for MVS.

Landmark Systems, 6142-B Rose Hill Drive, Alexandria, Va. 22310.

NCR CORP.
Software Development Environment

NCR Corp. has introduced a programmer's workbench program said to provide programming aids and tools intended to simplify the task of software development.

Software Development Environment (SDE) includes more than 120 individual, integrated tools for software development and maintenance. Tools are provided that generate test data and test programs. Other tools are said to provide a change control facility so that changes to programs can be tracked for auditing purposes.

More than 50 utility tools are provided that merge, rearrange and reformat files; print simple reports; and perform other functions.

The program includes a computer-based training course for SDE users, two modes of operation and on-line Help, the vendor said.

SDE also provides a library storage facility that can be used as a central repository for source programs. Within SDE, file access is controlled by an access manager that provides security for SDE files.

SDE is available for NCR's VRX operating systems. A license is priced at $265/mo.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

PANSOPHIC SYSTEMS, INC.
EZ/Key Version 2.1

Pansophic Systems, Inc. has announced Version 2.1 of its EZ/Key integrated prompter and syntax-directed editor for use with the company's Easytrieve Plus information retrieval and data management system.

According to a spokesman, the enhanced version features added system tuning parameters to expand performance. The parameters allow

DEC offers VAX-11 word processing tools

MAYNARD, Mass. — Digital Equipment Corp. has announced two word processing packages for its VAX-11 line of superminicomputers.

According to a spokesman, the WPS-Plus/VMS word processing package is a full-function word and document processing system featuring full screen editing, rulers, tabs, underlining, bold type, centering, library text and other menu-selectable functions, with on-line Help facilities.

The system also offers integrated, on-line, computer-based instruction that can be accessed without leaving the current document.

In addition, the package features list processing, sort and mathematical functions and an integrated filing system with keyword search for each user.

Also offered are user-definable processes for frequently used key sequences that allow a single keystroke to accomplish a sequence. A user-definable print facility is available for formatting page layouts, sizing and print pitch.

The second package, a DEC version of Microsystems Engineering Corp.'s Mass-11 word processing software, offers functions similar to those of WPS-Plus/VMS and has special features for the technical, legal and financial markets.
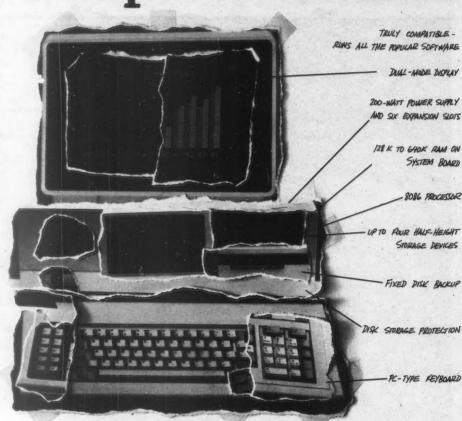
It features a technical character set with equation editing support; footnoting; redlining; automatic numbering; composite documents; column cut and paste; mini key pad numeric entry; footers and margins; and user-definable defaults and profile tables to tailor the operation to user needs.

WPS-Plus/VMS is priced at $6,000 and will run on the VAX-11/730, VAX-11/750, VAX-11/780, VAX-11/785 and Vaxcluster systems.

The DEC version of Mass-11 is available under the Digital Classified Software Program and is priced at $9,000. It will run on VAX-11/730 and larger systems, according to the vendor.

DEC's address is Maynard, Mass. 01754.

SOFTWARE & SERVICES

all or specific users to utilize incremental checking, select the size of the system buffer pool, specify the maximum number of errors inserted by the firm's EZ/Checker and control the use of foreground and background execution facilities.

Other features of Version 2.1 include passwords for greater control of system administrative functions, support of the Easytrieve Plus IDMS (a product of Cullinet Software, Inc.) and reduced paging in all environments. EZ/Key is said to provide control to alter the amount of virtual storage and CPU time used.

EZ/Key is priced at $9,000 for IBM's DOS environment and $15,000 for OS. Easytrieve Plus is priced at $21,000 for DOS and $27,000 for OS.

Pansophic, 709 Enterprise Drive, Oak Brook, Ill. 60521.

INFOTEK SYSTEMS, INC.
PRW/3000

Infotek Systems, Inc. has announced a new release of its report formatter for programmers using Hewlett-Packard Co. HP 3000 minicomputers.

Production Report Writer (PRW) 3000 is said to be compatible with HP's Dictionary/3000 data dictionary. For Cobol programmers, PRW/3000 is also said to enable users to use the Copylib or Cobol program instead of or in addition to the data dictionary. For non-Cobol programmers, it provides a special source library facility.

With PRW/3000, programmers reportedly have the ability to define their own data types and control the HP 2680, 2687 and 2688 laser printers.

The report writer is available for $2,500.

Infotek Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

VALUE COMPUTING, INC.
DCDS/A

Value Computing, Inc. has announced the addition of a report archiving and retrieval facility to its Data Center Distribution System (DCDS) package for IBM processors under IBM's MVS.

According to a spokesman, the cost-free DCDS/A option enables users to archive reports, assign retention periods of generations and days and retrieve archived reports for printing. It is designed to provide backup copies without requiring job reruns, and it ensures the security of sensitive reports by providing several levels of protection for archived reports.

The spokesman said the archiving and retrieval tasks are assigned security codes at installation. Users can assign passwords to individual reports as they are archived to protect them from unauthorized retrieval.

The system enables users to duplicate past report distribution, and users can retrieve and print reports according to the same DCDS parameters under which they were first produced.

The DCDS package, including archiving, is priced at $40,000.

Value Computing, 498 N. Kings Highway, Cherry Hill, N.J. 08034.

SYNCSORT, INC.
Syback Release 1.4

Syncsort, Inc. has introduced Release 1.4 of its Syback program for backup and restore functions on IBM VM systems.

Among the enhancements reportedly made to Syback Release 1.4 are improved elapsed time and enhanced direct-access storage device and tape capabilities. Syback Release 1.4 also reportedly can run in stand-alone mode while supporting interactive console communications. It can be installed as a disconnected batch machine, which provides security and the use of a user accounting chargeback facility.

Among its disk and file features, Syback Release 1.4 is said to offer an old-date/new-date option, for use with copying duplicate operations, and automatic disk formatting capability, which permits it to dynamically format the output disk.

Syback Release 1.4 is priced at $4,150/CPU for a one-year lease and $9,000/CPU for a three-year lease.

Syncsort, 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

PARA RESEARCH, INC.
Easy Report

Para Research, Inc. has announced Easy Report, a report generator for IBM System/34, 36 and 38 processors.

According to a spokesman, Easy Report allows a user to utilize any file in the system to design reports and listings. For users of Para Research's accounting software, Easy Report includes 28 Para Research accounting files predocumented for ease of use. Users can design reports by answering a series of English prompts provided by the system.

Easy Report uses user input to write an IBM RPG II program, which retrieves information from data files. The resulting report can be printed or displayed on a CRT terminal, and titles and columns are automatically centered.

Easy Report requires 38K bytes of memory and 1,000 blocks of library space. It is priced at $750.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

KOLIN CORP.
Kprobe

Kolin Corp. has announced Kprobe, a core dump analysis tool for mainframes under IBM's VM/CMS operating environment.

Kprobe enables full screen analysis of common dumps so users can view and compare several dumps si-

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multaneously, Kolin said. Central processor storage and storage from virtual machines reportedly can be examined and modified.

Users can create custom debugging macros without modifying source code and can format storage, instruction sequences and system control blocks, according to the vendor.

Kprobe costs $1,200 and has a $2,400 yearly maintenance option that includes upgrades and technical support.

Kolin, 3064 Scott Blvd., Santa Clara, Calif. 95054.

PRODUCTIVITY AIDS

NOVA GRAPHICS INTERNATIONAL CORP.
Device drivers for Nova*GKS

Nova Graphics International Corp. has announced a series of device drivers to be used with its Nova*GKS system, an application development tool that implements the international Graphical Kernel System (GKS) standard.

Among the device drivers released by Nova Graphics are the VT-100/102 for use with Digital Equipment Corp. systems; the Tektronix 4010/4014 and 4105 for Tektronix, Inc. systems; the IBM Personal Computer under PC-DOS with C binding; the Host/IBM PC for use with IBM mainframes and Personal Computer workstations; the Tandberg Data TDV 2230S for use with Tandberg Data, Inc. systems; the Prime Host for use with Prime Computer, Inc. systems; and the Univac Host for use with Sperry Corp. systems.

The firm said the device driver prices range from $500 to $3,000.

Nova Graphics International, Suite J-5, 13740 Research Blvd., Austin, Texas 78750.

PANSOPHIC SYSTEMS, INC.
IMS interface option to Gener/OL

Pansophic Systems, Inc. has announced an IBM IMS interface option to its Gener/OL fourth-generation programming language for on-line program development and query.

According to a spokesman, Gener/OL is designed for use under IBM's CICS teleprocessing monitor. The IMS interface option provides the capability to update, access and insert IMS data base records. It is priced at $7,500 for IBM's OS environment.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

APPLICATION PACKAGES

SOFTWARE INTERNATIONAL CORP.
Version 6.3 accounts payable

Software International Corp. has introduced a new version of its accounts payable program, which features the capability to handle electronic funds transfers.

Version 6.3 of the accounts payable program also features an embedded production report writer and an alternate payment methods function. Other major features include an on-line input and inquiry capability and real-time vendor file maintenance.

Initial deliveries of Version 6.3 will be for mainframe computers utilizing IBM's DOS operating system.

Prices range between $50,000 and $60,000.

Software International, 1 Tech Drive, Andover, Mass. 01810.

HEWLETT-PACKARD CO.
HP Patient Care Management

Hewlett-Packard Co. has introduced an addition to its HP Healthcare Information System. HP Patient Care Management automates patient admissions, transfers, discharges, order entry and communications. It runs on the HP 3000 using standard terminals or on the HP 150 touchscreen personal computer acting as a terminal.

During the admission process, HP Patient Care Management allows collection of demographic, clinical and financial data on inpatients and outpatients. The system also can be used to gather information and order tests and procedures prior to admission. The system displays an up-to-date status of all hospital beds to facilitate bed assignment, the vendor said.

HP Patient Care Management has a base price of $120,000 for software and $450,000 for hardware, including a computer, disk drives and terminals.

Hewlett-Packard, Medical Products Group, 3000 Minuteman Road, Andover, Mass. 01810.

DATATREND, INC.
Datacalc Version 3
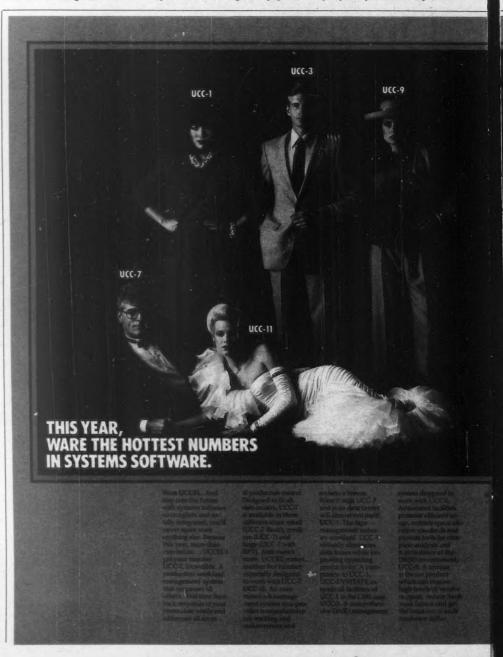
Datatrend, Inc. has announced Version 3 of its Datacalc electronic spreadsheet for Digital Equipment Corp. VAX-11 superminicomputers in the DEC VMS environment.

According to a spokesman, a significant portion of the enhanced release has been written in VAX-11 native-mode assembly language to improve performance for time-critical operations. Calculations reportedly are 10 times faster than in previous versions. Other features include an index of saved spreadsheets and columns and rows that can be sorted in ascending or descending order or moved to new locations.

The spokesman said Datacalc spreadsheets are "three-dimensional," meaning that active spreadsheets can retrieve data from other spreadsheets. An automatic consolidation feature has been added to Version 3 for consolidating several spreadsheets into one, and an on-line help capability has been implement-

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ed to provide help text at every level.

Other enhancements include new function and display formats, including hidden columns and floating dollar signs.

Version 3 of Datacalc costs $1,795. *Datatrend, 395 Ironwood Drive, Salt Lake City, Utah 84115.*

HEWLETT-PACKARD CO.
HP 79001CS

Hewlett-Packard Co. has announced a hospital financial management software application designed to run on its HP 3000 line.

According to a spokesman, the HP 79001CS hospital financial management application is a part of HP's Healthcare Information System, which is designed to provide clinical, financial and administrative information to a medical facility. The application is said to offer hospitals complete access to financial information on-line in any report format desired.

The application reportedly creates a data dictionary that allows the user to extract information in the format desired. It also provides for real-time processing of data. The system offers comprehensive case-mix management, medical records applications and extensive management reporting.

The HP 79001CS is priced between $100,000 and $450,000, depending on configuration.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

SOFTWARE 2000, INC.
GL 2000

Software 2000, Inc. has announced the GL 2000 general ledger system for the IBM System/38. The product can be used to create Lotus Development Corp. 1-2-3 spreadsheets from GL 2000 data.

The system provides a 36-char., free-format account number that can be broken into nine segments such as company, division, cost center, account and subaccount. The user defines the number of characters assigned to each segment and the name of the segment. Each company in the system can have a unique structure.

Two report writers are available with the GL 2000. The product also features dynamic split-screen menus; multiple-window screens; four-tier help text at the field, screen, function and command-key levels; subfile lookup and select; field-level security, lockable menus; user-specified printer controls; on-line printed documentation; and a data dictionary.

The one-time license fee for the GL 2000 is $22,000.

Software 2000, 64 Enterprise Road, Hyannis, Mass. 02601.

ISSCO GRAPHICS
Tables

Issco Graphics has announced an option to its Tell-A-Graf graphics software that reportedly allows users to report numbers, words and symbols in organized, tabular format.

According to a spokesman, the Tables option allows Tell-A-Graf users to display data simultaneously in both tabular and graphics form.

Tables draws upon Tell-A-Graf data files to convert charted information to tabular form. The software also incorporates Issco's The Data Connection software so that users can directly access data files, manipulate data and display the results in tabular format.

Features of the Tables option include calculating data for total, difference, average and median and printing the results; creating tables with complete labeling; intermixing numeric tables with text columns and using symbols; and controlling character appearance, table borders, content position, underlining and background color.

The spokesman said versions of Tell-A-Graf are available to operate on most mainframes and minicomputers. The Tables option is priced between $1,000 and $10,800, depending on host environment.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

ARETE SYSTEMS CORP.
Osap software

Arete Systems Corp. has added several software products to its Open Software Architecture Program (Osap) software for its Unix System V-based systems.

One of the Osap software offerings is PC Works from Touchtone Software Corp., which allows Arete users to communicate with IBM Personal Computer networks under Arix, Arete's proprietary Unix System V. Also included are Unify Corp.'s Unify, a relational data base management system; Real World Software, Inc.'s MBSI, an integrated accounting package; and Silicon Valley Software, Inc.'s SVS Pascal, SVS Fortran and SVS Xbasic.
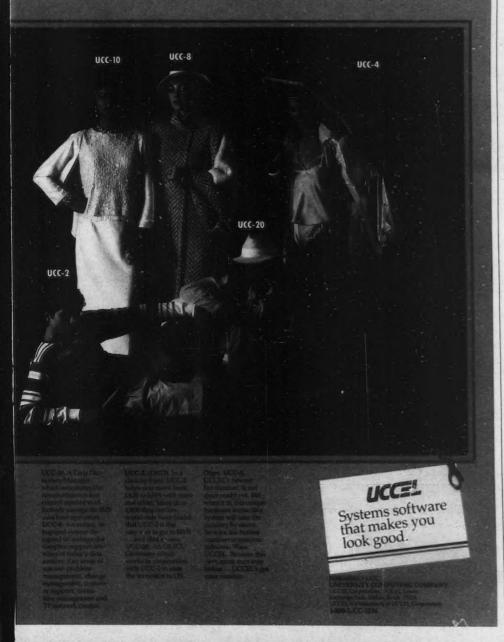
In addition, Arete is offering its own C compiler and Ryan-McFarland Corp.'s RM/Cobol and RM/Fortran. Also included are Software Innovations, Inc.'s AVL, a C-style language; and Plus Five Computer Services' Mumps language.

They are offered at the following prices: PC Works, $495; Unify, $1,500; MBSI, $4,520; SVS Pascal, $2,100; SVS Fortran, $2,100; SVS Xbasic, $3,100; Arete's C compiler, $700; RM/Fortran, $1,250; RM/Cobol, offered in a Cobol runtime-only version, $450; AVL, $1,200 for 16 users; and Mumps, $5,000 to $10,000, depending on the number of users.

Arete Systems, 2040 Hartog Drive, San Jose, Calif. 95131.

PARK SOFTWARE, INC.
Mentis

Park Software, Inc. has introduced a report writer and query system for Digital Equipment Corp.'s VAX-11

Software International
Understands That Human Resource Management

That's why Software International Financial and Personnel

SOFTWARE & SERVICES

superminicomputer line.

Mentis selects, sorts and formats information from any application package using DEC's RMS operating system on a VAX-11 computer, according to a vendor spokesman.

Mentis creates command files so that all responses to a session may be saved for later use, the vendor spokesman said.

Its Save Selected Records function puts the address of selected data records into a file for later retrieval by either Mentis or a user-written program, the spokesman commented.

Other features include format control; multilevel security; conditional calculations; and logical, arithmetic and comparison operations, according to the vendor.

The Mentis data dictionary feature was designed to accommodate Park's data management products, according to the spokesman for the vendor.

Available options include a file/record generation capability and interfaces to a variety of word processing and spreadsheet/financial modeling packages, according to the company spokesman.

Prices range from $4,000 to $7,000, according to the spokesman for Park Software.

Park Software, P.O. Box 202, Northgate Station, Seattle, Wash. 98125.

SOFT PRO SYSTEMS, INC.
Purchasing System

Soft Pro Systems, Inc. has introduced a purchasing program for use with the Wang Laboratories, Inc. VS operating system.

The Purchasing System is said to provide managers with reporting and analysis of their purchase order systems. The program includes three subsystems: purchase order, packing slip and invoice, the vendor said.

The three subsystems reportedly keep track of purchase orders, packing slips and invoices through their various stages to provide on-order information, give the receiving status of an order, provide average price information to inventory, report accounts payable information for vendor payment and produce information for management analysis.

The package is priced at $5,000/CPU.

Soft Pro Systems, 4121 MacDonald Ave., Richmond, Calif. 94805.

GLOBAL SOFTWARE, INC.
Hospital Cost Control System

Global Software, Inc. has announced a cost accounting software package to help hospital administrators control Medicare costs. Designed in response to the federal government's Prospective Payment System, the Hospital Cost Control System (HCCS) operates under IBM's CICS operating system on IBM 30 and 4300 series and plug-compatible mainframes.

HCCS organizes and analyzes diagnostic-related grouping (DRG) costs. Each DRG profile in the HCCS contains line items for professional services, laboratory tests, supplies and other items, the vendor said.

Functions include actual cost variance analysis, gross revenue accounting, profitability analysis, financial modeling and forecasting and trend analysis. HCCS also contains its own hospital ledger and report generator.

The price of HCCS ranges from $75,000 to $150,000, depending on host system hardware.

Global Software, P.O. Box 51248, 1009 Spring Forest Road, Raleigh, N.C. 27609.

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SIGMA CONSULTING GROUP
Maintenance software program

Sigma Consulting Group has introduced a modular maintenance software package for facility and plant equipment maintenance.

The program reportedly runs on any microcomputer or minicomputer using the Pick & Associates, Inc. Pick operating system.

It includes modular elements such as work order control, equipment history, preventive maintenance, parts inventory control and cost and management information reporting.

The cost of the system with all five elements is $40,000.

Sigma Consulting Group, Suite 104, 12465 Lewis St., Garden Grove, Calif. 92640.

FOUR-PHASE SYSTEMS, INC.
Electronic Mail System/IV;
Electronic Worksheet System/IV

Four-Phase Systems, Inc. recently introduced a menu-driven electronic mail software package and an integrated spreadsheet program for use with the company's 4000 and 5000 computer systems.

Electronic Mail System/IV (EMS/IV) can transmit notes and packages of text or system files to any user within the electronic mail network, the company said. Based on a shared-resource network architecture, EMS/IV allows independent 4000 and 5000 systems to send and receive Four-Phase's Foreword word processing files, control and source files, compiled Cobol and assembler absolutes and any file stored in the firm's Interrupt Disc Operating System.

The Electronic Worksheet System/IV (EWS/IV) is a menu-driven, multiworkstation tool that operates with all other Four-Phase Multi Function Executive 4000 and 5000 software applications, the vendor said. The program reportedly accepts English-like commands and lets users revise and analyze data and mail it electrically to other users.

Business applications include forecasting, planning, sales projections, expense reports, financial analysis of income statements, balance sheets and job costs, budgeting and statistical analysis, the vendor said.

A permanent license for EMS/IV is available for $1,000 per system processor. The one-time licensing fee for EWS/IV is $1,500.

Four-Phase Systems, 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

PLEXUS COMPUTERS, INC.
Software Referral Catalog

Plexus Computers, Inc. recently released the "Plexus Software Referral Catalog," which lists more than 150 Unix application software packages currently available for the company's Unix-based supermicrocomputers.

Packages include high-level language compilation, data base management, word processing, spreadsheets, text editing, general accounting and financial analysis, communications, application generators, business graphics, statistics and math, menu and system management and numerous utilities and vertical applications.

The catalog is available free of charge, according to a spokesman for the company.

Plexus Computers, 2230 Martin Ave., Santa Clara, Calif. 95050.

SYSTEM SOFTWARE ASSOCIATES, INC.
BPCS Process Manufacturing Software

System Software Associates, Inc. has announced a process manufacturing package for use on the IBM System/36 in industries such as pharmaceuticals, chemicals, food processing and medical equipment.

The BPCS Process Manufacturing Software is said to contain features designed to handle lot control and traceability requirements, expiration of lots, potency, quarantine, inspection, batch bills and yield analyses.

Modules include inventory management, production activity control, purchasing, bill of materials processing, material requirements planning, capacity planning and batch and product costing.

Available now, the package costs $30,000 with source code and documentation.

System Software Associates, 200 W. Madison, Chicago, Ill. 60606.

RECOGNITION CONCEPTS, INC.
Fast Fourier Transform

Recognition Concepts, Inc. (RCI) has announced software designed to perform fast Fourier transforms on variable image arrays of up to 2,048 by 2,048 32-bit pixels. Fast Fourier Transform is designed for the Vector Pixel Processor option to RCI's Trapix 5500 system.

It performs forward and inverse two-dimensional Fourier transform and includes modules for frequency domain weighting and filtering as well as power spectral density computation and display, according to the vendor. Execution time for a two-dimensional fast Fourier transform over a 1,024- by 1,024-pixel array is said to be approximately 25 seconds.
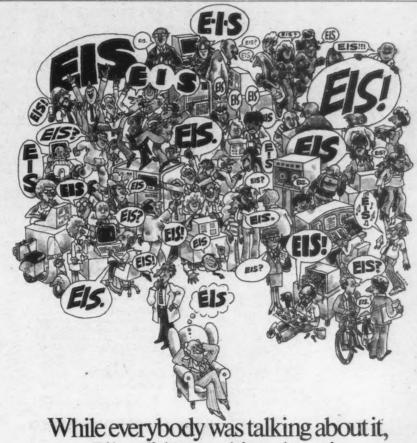
The price of Fast Fourier Transform is $1,200.

Recognition Concepts, 924 Incline Way, P.O. Box 8510, Incline Village, Nev. 89450.

EXECUTIVE TECHNOLOGY DATA SYSTEMS, INC.
Small Business Accounting

Executive Technology Data Systems, Inc. (ETDS) has announced Small Business Accounting, a new release of its client accounting system for certified public accountants, designed for IBM System/34 and 36 minicomputers.

The system includes several new

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features, including a quick client set-up procedure and an automated working trial balance subsystem.

The system is priced at $7,500 on the System/34 and $8,500 on the System/36.

ETDS, Suite 108, 28104 Orchard Lake Road, Farmington Hills, Mich. 48018.

LANGUAGES

RAPITECH SYSTEMS, INC.
Fortrix-C

Rapitech Systems, Inc. has announced the Fortrix-C package for users of the Unix operating system and the C programming language.

According to a spokesman, Fortrix-C converts Fortran language programs and files to C code. It is said to be configured to meet the requirements of a variety of Unix environments and includes integer-character string converters, space allocators, string parsers and other string manipulators. In operation, Fortrix-C converts Fortran flow control statements to functionally equivalent sets of C instructions.

Read/write field widths are retained, and the C code spacing requirements are exactly those of the parent Fortran program. Output streams for both the original and the new code reportedly look the same.

Fortrix-C executes at a typical conversion rate of 600 lines of code/min, the spokesman said.

Fortrix-C is priced at $2,500.

Rapitech Systems, 565 Fifth Ave. New York, N.Y. 10017.

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is a visit to another data processing shop. Ideally, it should be a company in the same industry. But in any case, the value is maximized when both companies are using the same or similar hardware and software.

■ In-house communications. Brainstorming sessions to attack specific problem areas or to produce ideas for improved productivity can be rewarding for the company as well as for the employees. Presentations by the staff on projects or new techniques not only provide for shared information, but also help employees develop their communication skills. If the software people take a regular coffee break together, I suspect their conversations usually turn toward work, and some of the best communication occurs during these times.

■ Publications. The manager should see that the staff has access to some of the better computer publications on a current basis. Employees also need to be allowed the time to read such periodicals. Many good publications are free. Others carry only a nominal cost.

Do not, in either case, limit the number of circulated copies so that the issues are weeks old before an individual sees them. These ideas cost time and money. But they are an investment in the future of the information systems organization as well as in the company itself.

By allowing analysts and programmers to expand their knowledge and to be exposed to new ways of doing things, this plan will increase the employees' productivity. Additionally, they will become better businessmen.

R&D from page 55

company with a stable and focused business plan can end up with a series of income statements that weave like the path of a drunken sailor.

Furthermore, with no assets against which to borrow and no measurable revenues, these companies can look like so many hot potatoes to potential investors.

Naturally, many companies would prefer to treat the costs of developing a software product as an asset. This would allow them to depreciate the costs over several years and would make their balance sheets look more attractive.

However, this approach also harbors many hazards. Since software products have usable life spans ranging from two to 20 years, it is virtually impossible to develop capitalization guidelines that will be acceptable to everyone. In fact, it was abuses of those very procedures that led the Securities and Exchange Commission last year to ban temporarily the practice of capitalizing software costs unless a company had already been doing so.

However, the rules may be changing soon. The Financial Accounting Standards Board, which sets accounting industry rules, has taken the capitalization/expense controversy under consideration. Later this month, a working group within the board is expected to release an "exposure draft" on its recommendations and conclusions to date. If the board accepts it, the draft document will go out for public review, which offers companies a chance to comment on this controversial rule. Price Waterhouse is trying to stir up interest in the debate by releasing a survey it conducted of the accounting practices of 24 major software firms.

The study looks at how the companies recognize revenues and deal with R&D expenses. It also looks at some of the tax consequences of various approaches. Not surprisingly, the report also includes a hefty plug for Price Waterhouse services. Nevertheless, it is useful background.

Price Waterhouse is urging software companies and investors to make their feelings known on this issue. MacKinnon said the best way is to write to the Financial Accounting Standards Board or talk to your independent accountant.

A free copy of Price Waterhouse's report can be obtained from the firm, which is located at One Federal St., Boston, Mass. 02110.

COMMUNICATIONS

Satellite service to target private-line mart

By John Dix
CW Staff

MOUNTAIN VIEW, Calif. — A low-cost, two-way digital satellite service will be made available later this year to users who operate large transaction-oriented networks, if all goes according to the plans of a company here.

Equatorial Communications Co., founded in 1979, presently provides a point-to-multipoint, one-way information delivery service via satellite. Companies use the service to distribute things like news or financial and commodities data. In July, the $18 million company reported the installation of its 15,000-user earth station.

Now Equatorial has set its sights on the $6 billion private-line market and is readying a two-way digital satellite communications service targeted at users in the Fortune 200 companies that operate networks with 500 or more drops. Six companies are presently testing the service — which is slated to be generally available in the fourth quarter of this year — including

Citibank in New York and Niagara Mohawk Power Corp. in upstate New York.

Equatorial's two-way service is geared to transaction processing applications used by many industries, including insurance, banking and retailing, according to Philip L. Arst, Equatorial's director of marketing. By nature, transaction processing data traffic is typically point-to-multipoint — users from many locations accessing a central data base — and asymmetrical, with a user's data base inquiry being 40 to 50 characters and the response consisting of 400 to 500 characters, Arst said.

To meet the particular needs of this application, Equatorial has developed a system whereby users connect their centralized data base to Equatorial's master antenna and distribute 4-ft micro earth stations to remote sites that need to access that storage vault.

The remote locations use the micro earth stations to beam inquiries up to the satellite, where they are bounced back down to Equatorial's master antenna and

then relayed to the data base. The response to the query is handled in a similar manner. Reflecting the lopsided data flow typical of transaction processing, inbound inquiries are usually transmitted to the data base at 1,200 bit/sec, and outbound responses are broadcast at 19.2K bit/sec.

The location of the user's data base, according to Arst, is inconsequential. "A cross-country line is about $3,000, or twice that for two lines, but if you are dividing that cost by a thousand user locations in the field, then it is negligible."

Multiple access to the centralized resource is provided to the individual micro earth stations with a technique called code division multiplexing, whereby each station is identified by a several thousand bit code. This prevents one station from interfering with another, according to Arst.

The company also uses this type of addressing to provide point-to-point communications between remote micro earth stations, with the master antenna acting as a switch. This requires a double hop — from

Equatorial's satellite network to be put through the paces

While the use of Equatorial Communications Co.'s satellite communications system is expected to save Citibank money, the company expects that the real value of the system will be realized in the creation of new business opportunities.

Citibank in New York City and Niagara Mohawk Power Corp. of Syracuse, N.Y., are two of six companies presently testing Equatorial's two-way satellite service, slated for commercial availability by the end of the year.

Charles Baber, manager of engineering development at Citibank, reported that his company will have 10 to 20 Equatorial micro earth stations installed by the end of the year. One test site is operational.

The bank intends to use the system between branches initially to meet the inquiry response needs of a personal or direct lending application. Under the second phase of installation, expected to commence next year, 150 more micro earth stations will be installed.

"With this type of network, the problems you have to deal with are more administrative than technical," Baber said. "To do

Spread-spectrum technology at core of satellite service

Equatorial Communications Co.'s satellite services are made possible by a technological spin-off of radio astronomy that the company patented.

The so-called spread-spectrum technology enables Equatorial to use the small, inexpensive 2-ft earth stations in its one-way service and 4-ft stations in its two-way service.

In domestic satellite communications, typically a bit (1 or 0) is represented by a single signal element such as a shift in frequency.

With the new technology, a bit is stretched out and represented by 100 signal elements called a chip. This gives the small earth stations 100 chances to decide if what they are receiving is a 1 or a 0.

Beside being less expensive, the small antennae make it easier for users to hide the dishes behind rooftop obstructions like elevator shafts to mitigate interference problems.

Equatorial's satellite system, like most domestic communications satellites and terrestrial microwave systems, uses radio frequencies in the 4- to 6-GHz range.

MCI Document Plus allows data exchange among word processors

WASHINGTON WIRE
Phil Hirsch
CW Washington Bureau

A major shortcoming of public electronic message networks that enable word processing devices to communicate, is their inability to compensate for differences in the way various machines handle text commands.

These codes are used to define how text processing devices provide for things like underlined text, boldface characters and other similar features. Every manufacturer implements different codes to represent the same text-processing command.

Until recently, none of the commercial networks have provided a

way of converting from one code to another. But now MCI Digital Information Services Corp., a subsidiary of MCI Communications Corp., is marketing a service that reportedly enables textual information to be exchanged between seven brands of word processors in the form in which it was originated.

Word processor communication

According to Vinton Cerf, vice-president of engineering for the MCI subsidiary, the new service, called Document Plus, enables documents to be communicated between word processors from CPT Corp.; Digital Equipment Corp.; IBM; Lanier Business Products, Inc.; NBI, Inc.; Wang Laboratories, Inc.; and Xerox Corp. These machines, he said, represent 85% to 90% of the communicating word processors now in use. Cerf

also said that early next year, MCI plans to extend its new service to personal computers that have word processing capability.

Document Plus is available only to users of MCI Mail, the company's electronic messaging service, and costs the customer an additional $20 per month. Cerf expects it to be particularly useful to those who need extensive text-processing capabilities, such as lawyers, engineers and doctors.

In addition to accompanying textual commands, the new service handles irregular spacing, irregular indentation and column formatting instructions.

Simplifies editing chores

It also makes the recipient's editing chores easier, since codes defining each component of the transmit-

ted document — paragraphs, headers, footnotes and page numbers, for example — are accepted by the receiving machine.

The Document Plus conversion is performed by the RTI 404 microprocessor, developed by Racal Telesystems, Inc. (RTI) of Chicago. Each network node through which MCI Mail Service is provided has a set of 404s; a separate one interfaces with each make of communicating word processor served.

The 404s convert the text-processing codes of incoming messages to a standardized code, which the company calls Racal Normal Form, in which it remains while stored in the recipient's electronic mailbox. When called for, the message is converted by another 404 into the code used by the receiver's word processor.

COMMUNICATIONS

Firms develop video meeting system for IBM network

HARTFORD, Conn. — Two companies have developed a video teleconferencing system that can be integrated into a user's IBM network to take advantage of existing communications facilities.

Developed jointly by the Travelers Corp. of Hartford, Conn., and American Video Teleconferencing Corp. of Oceanside, N.Y., Inforum is a slow scan video meeting system that uses an IBM Systems Network Architecture (SNA) network as the distribution vehicle for photographic and computer-generated images.

Because the system uses communications lines that operate at 9,600 bit/sec or 19.2K bit/sec and are presumably already part of an SNA net-

work, it is estimated that Inforum can be used at one-tenth of the recurring cost of a full-motion video teleconferencing system.

Inforum facilities include proprietary bridging software, an IBM Personal Computer and associated software, a proprietary communications controller, room controller and standard audio and video communications equipment.

The bridging host software runs on IBM 3080 series machines and operates in single- or cross-domain SNA environments. The software supports up to 10 concurrent sessions with remote sites that have IBM 3705 or 3725 front-end processors.

The communications controller is

said to be the hub of the system; it physically and logically connects the other system components. The room controller is microprocessor-based and, through a flat panel control screen, guides use of the system with menus. All functions relating to conference setup emanate from the room controller.

The use of the Personal Computer comes into play with a proprietary software package called Decision Images. This package enables the off-line creation of text, graphs, spreadsheets and user-created drawings in a single screen frame. During the conference, this information can be displayed using the Personal Computer in the teleconference room and dis-

tributed to all participating locations in less than five minutes.

The Personal Computer can display spreadsheets with 12 columns and 20 rows, the parameters of which can be changed during a session and the recalculations distributed to the other locations.

The service does not accommodate audio conferencing, necessitating separate telephone connections to each conference location.

Conference rooms, with associated hardware and software, can cost up to $150,000 to outfit.

More information on the system is available from American Video Teleconferencing at 2949 Long Beach Road, Oceanside, N.Y. 11572.

AT&T proposes teleconferencing service to FCC

BEDMINSTER, N.J. — AT&T Communications recently proposed an audio and graphics teleconferencing service that would enable users to bring together up to 59 locations to a central hub or bridge.

In a tariff filing with the Federal Communications Commission, AT&T called the service the Alliance Teleconference Bridge. The service is scheduled to be up by Sept. 16.

The system calls for the establishment of bridge sites in Chicago, Dallas, Los Angeles and White Plains, N.Y. To initiate a conference, a user would select the type of call — audio only, graphics only or audio/graphics — and establish a contact with the appropriate bridge. Once this is made, other locations would be added to the bridge simply by dialing.

Locations can be dropped, added or re-added to a conference at any time. The service provides audio support and data speeds of 4,800 bit/sec.

The service is billed using standard long-distance rates, with each leg being charged for its connection to the bridge. There is also a per-minute usage fee charged for each bridge connection.

More information is available from AT&T Communications in Bedminster, N.J. 07921.

COMMUNICATIONS CONTROLLERS

ABLE COMPUTER, INC.
VMZ/32N; DH/DM

Able Computer, Inc. has announced price reductions for two of its Digital Equipment Corp.-compatible controllers, the VMZ/32N and the DH/DM. Previously priced at $3,750, they are now $3,250 each.

The VMZ/32N is a communications multiplexer for DEC VAX-11 computers under VMS. It reportedly provides 16 asynchronous communications lines that can be programmed independently and offers full modem control. It also reportedly requires only half the space and bus loading

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of its DEC counterparts.

The DH/DM reportedly connects any DEC PDP-11 Unibus system to 16 asynchronous communications lines and offers modem control and direct memory access output on all lines.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

VOICE/DATA COMMUNICATIONS

METAPATH, INC.
Robin Centralized Modular Data PABX Model 5580

Metapath, Inc. has announced a data switch that is said to be capable of addressing up to 64 serial and 16 parallel ports and linking dissimilar computer systems, terminals and peripherals.

The Robin Centralized Modular Data PABX Model 5580 (CMDP-5580) is intended for high-density computer room operations. The unit houses 16 modules, each containing four RS-232C ports and an optional parallel port, for a total of 80 ports.

The CMDP-5580 is said to allow printer sharing and modem pooling in addition to mainframe interconnection for both synchronous and asynchronous systems.

Each 5580 contains 16 Zilog, Inc. Z80 microprocessors, 1M byte of on-board user memory, 32K bytes of nonvolatile control memory and configuration control.

Prices are said to average about $240 per port.

Metapath, 737 Lincoln Centre Drive, Foster City, Calif. 94404.

OCTEL COMMUNICATIONS CORP.
Aspen enhancement

Octel Communications Corp. has announced an enhancement to the Automatic Speech Exchange Network (Aspen) voice message system that increases the system's port capacity from 16 to 24.

The Aspen voice message system can, according to the vendor, be used with any private branch exchange (PBX) and can also be used with any Centrex system. The four-port system can serve from 100 to 250 users, while the largest system will support from 1,500 to 3,000 users.

User features include: voice mail (subscriber-to-subscriber), telephone answering, sending and delivery options, message review and processing features, message notifications and full voice prompting, the company said.

The 24-port system costs $145,000, while the 16-port system costs $135,000, the vendor said.

Octel Communications, 1841 Zanker Road, San Jose, Calif. 95112.

PROTOCOL CONVERTERS

INNOVATIVE ELECTRONICS, INC.
MC 800

Innovative Electronics, Inc. recently introduced a protocol converter that allows up to 32 asynchronous Ascii devices to communicate with host computers using either Systems Network Architecture/Synchronous Data Link Control or Binary Synchronous Communications protocols.

Many remote terminals, connected via asynchronous modems, can timeshare a single MC 800 at the main computer site. Any mixture of CRT terminals and printers may be attached, with the unit providing automatic speed detection.

The MC 800 comes in nine configurations from five to 32 ports and is said to support more than 100 different types of asynchronous terminals, including color tubes, teleprinters and personal computers. Price for the five-port unit is $3,600.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

INNOVATIVE ELECTRONICS, INC.
MC-80/602

Innovative Electronics, Inc. has announced a communications processor designed to convert an asynchronous Ascii host into an IBM 3270-type device.

The MC-80/602 reportedly emulates an IBM 3271, 3274-51C or 3276 communications controller in local and dial-up applications to provide IBM 3277-1, 3277-2 and 3278-2 terminal communications using Ebcdic Binary Synchronous Communications.

It is said to perform full screen mapping and provide virtual screen sizes of 480, 960 and 1,920 characters.

A switch selection reportedly enables the MC-80/602 to communicate with an asynchronous Ascii host for file transfer with a blocking feature built in. This is said to allow the IBM Personal Computer, Digital Equipment Corp. PDP-11/70, DEC VAX-11/780, Radio Shack TRS-80 and other computers to communicate locally or with a remote IBM mainframe using 3270 bisynchronous communications.

The MC-80/602 costs $1,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

SOFTWARE

CENTENNIAL COMPUTER CORP.
Talon

Centennial Computer Corp. has announced Talon, a communications package for computers that run the Unix operating system.

According to the vendor, Talon supports a number of communica-

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tions protocols, including asynchronous, synchronous, IBM 3270 and 3278 Binary Synchronous Communications, Systems Network Architecture, X.25 packet switching and Ethernet.

The menu-driven package is reportedly written in C. Its cost ranges from $200 on a personal computer to $20,000 on a larger system.

Centennial Computer, 6100 Executive Blvd., Rockville, Md. 20852.

MULTIPLEXERS/ MODEMS

RACAL-MILGO, INC.
Omnimux 4, 8

Racal-Milgo, Inc. has announced two additions to its Omnimux series of statistical multiplexers. The Omnimux 4 and Omnimux 8 support up to four or eight asynchronous channels, respectively, with all channel configurations set independent of each

other, the vendor said.

The models are said to be compatible with all multiplexers in the Omnimux series, including the Omnimux 80, 160 and 320. Both models support data speeds up to 9,600 bit/sec on all channels. Additional standard features are said to include aggregate and channel loopback, flow control and error control.

The Omnimux 4 is available now for $1,200 a unit. The Omnimux 8 is scheduled for delivery this month for

$1,700 for the four-channel model and $2,300 for eight channels.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

AUXILIARY EQUIPMENT

CONNECTICUT MICROCOMPUTER, INC.
Ayby

Connecticut Microcomput-

er, Inc. has announced an RS-232 A-B switch with speed and parity-matching capabilities.

The Ayby reportedly was designed for office and laboratory use, enabling the user of a 9,600 bit/sec terminal to switch instantly to a 1,200 or 300 bit/sec connection with different connection parities.

Ayby is said to include three female DB-25S connectors as used with RS-232: one for the 9,600 bit/sec terminal; one for a 9,600 bit/sec connection, such as a direct line to a computer; and one for a 1,200 or 300 bit/sec connection, such as a modem.

The company said a slide switch allows changing the connection from 9,600 to 1,200 or 300 bit/sec. The Ayby costs $300.

Connecticut Microcomputer, 36 Del Mar Drive, Brookfield, Conn. 06804.

CANOGA DATA SYSTEMS, INC.
CBE-200

Canoga Data Systems, Inc. has announced a general-purpose, parallel-to-serial or serial-to-parallel multiplexer designed to link graphics display workstations to a host at distances as great as two kilometers.

The CBE-200 fiber-optic bus extender, which is targeted at computer-aided design and manufacturing, uses a direct memory access interface module to connect to the Digital Equipment Corp. Unibus and Q-bus.

It is said to communicate at speeds up to 12M bit/sec over two fibers and to be compatible with ribbon cable off the DR11-W interface.

It costs $2,750.

Canoga Data Systems, 21218 Vanowen St., Canoga Park, Calif. 91303.

INSURANCE TECHNOLOGY CONSULTANTS
Asynchronous Communications Emulators

Insurance Technology Consultants has announced a series of Asynchronous Communications Emulators (ACE) that are said to enable IBM Personal Computers and compatibles to emulate Honeywell, Inc. VIP7200, VIP7301 or VIP7303 terminals.
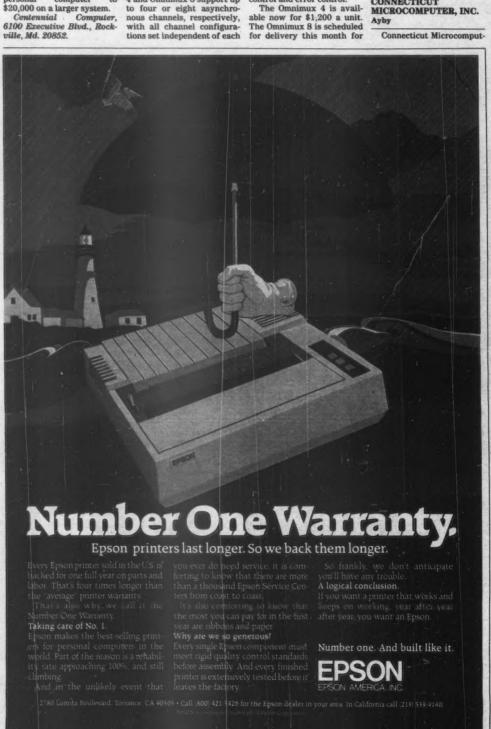
ACE uses the standard Honeywell terminal interface and functions independent of the processor and operating system, the vendor said.

To use ACE, IBM Personal Computers or compatibles must have one disk drive, 128K bytes of memory, an 80-col. display and a communications port.
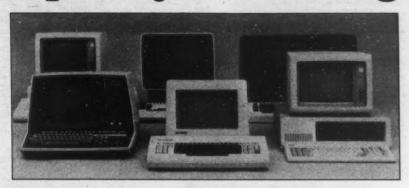
It is priced at $295.

Insurance Technology Consultants, Suite F, 1437 W. Palmyra, Orange, Calif. 92668.

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ATLANTIC RESEARCH CORP.
DPS-5 Data-Patch

Atlantic Research Corp. has announced a patching and switching system said to activate and monitor spare and off-line equipment.

The DPS-5 Data-Patch provides crossover switching, patching and access to both on-line and off-line circuits. The unit also can be configured to provide common A/B switching, the vendor said.

DPS-5 is said to enable the accessing, testing and monitoring of primary circuits, as well as off-line backup equipment.

The price is $8,935.

Atlantic Research, 5390 Cherokee Ave., Alexander, Va. 22314.

ALGO, INC.
Algo Message Concentrator 600

Algo, Inc. has announced its Algo Message Concentrator 600, designed to handle local and remote networking of IBM Personal Computers and compatibles with existing minicomputers and microcomputers.

It reportedly allows connection of up to 256 stations connected locally or through leased or switched telephone lines and requires an RS-232C interface and Basic I/O statements for connection.

It stores operating parameters, including a routing table; each channel's network address; data format and data rate in electrically erasable programmable read-only memory.

The Message Concentrator 600 is said to have six independent channels that operate in synchronous or asynchronous modes at speeds up to 19.2 bit/sec. A six-port unit costs approximately $1,600.

Algo, 9198-C Red Branch Road, Columbia, Md. 21045.

LIBERTY ELECTRONICS CO.
Freedom 212 Remote Information Station

Liberty Electronics Co. has announced the Freedom 212 Remote Information Station, a voice/data terminal said to combine terminal functions, data communications and telephone capabilities.

The Freedom 212 features include a tilt-and-swivel display, a 106-key keyboard with 47 programmable keys, a built-in AT&T 212A-compatible modem, a 25-number telephone directory and an automatic dialer.

The Zilog, Inc. Z80-based device has 8K bytes of memory and supports Ascii transmission code, the company said.

The Freedom 212 costs $1,295.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.

INNER ACCESS CORP.
8-I/O
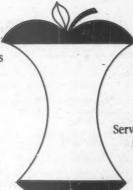
Inner Access Corp. has announced an eight-channel interface expander, 8-I/O, for use with devices built on S-100 buses. The IEEE-696-compatible card plugs into a single S-100 bus and provides eight RS-232C ports.

Up to eight of these cards reportedly can be used in any S-100 bus, providing a total of 64 channels.

The price of one card is $695 or $383 in quantities of more than 100.

Inner Access, 517-K Marine View, Belmont, Calif. 94002.

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a coordinated installation at 20 sites takes roughly a 29-page engineering project plan, not including the individual site activity."

For its part, Niagara Mohawk is testing the Equatorial system in an energy management system.

Dr. Roosevelt Fernandes, manager of research at the upstate New York power company, reported that it is using four micro earth stations in an acceptance test scheduled to be completed by the end of next month.

"We're trying to determine the pros and cons, technical and economical feasibility of Equatorial's system" for this application, Fernandes said. Depending on the success of the first testing phase, 16 more sites will be added later. The network could potentially be used to support more than 600 remote stations.

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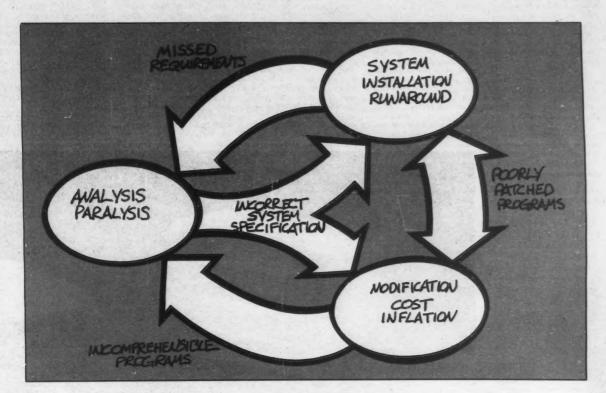
micro earth station up to the satellite, down to the master antenna and then back up and down to the other remote micro station — that drastically increases communications delays and precludes use of the system for certain applications.

Arst said that the system is designed to be transparent to the user and not require any software modification. When interfaced to an IBM Systems Network Architecture (SNA) network, for example, the service provides level two data link functions and appears to a user's IBM 3705 front-end processor as a 3726 terminal cluster controller.

The average cost per drop in an Equatorial network, Arst said, is between $200 and $250. This is based on recurring monthly fees and the purchase price of the C-200 micro earth stations, which cost about $6,000 per station in quantity. Arst said the earth stations are often less expensive than 9,600 bit/sec modems. The monthly net service charges can vary from $10,000 to $100,000. The cost per drop depends on how many remote stations share the fixed costs for use of the master earth station and the satellite.

The company claims that the system is less expensive to operate than a private leased-line network used for the same application. Another benefit is a guaranteed bit-error rate of 10 to the negative seventh, which Arst claims is two magnitudes better than is available on terrestrial lines.

IN DEPTH

Of time and analysis

By John F. Palmer

The problem is not how to represent requirements but how to figure out what they really are. The solution: define what should and should not be specified; develop strategies for applying the tools of structured analysis and the new specification framework. Then systems developers can spend their time developing systems instead of developing methodologies for developing systems.

In an age of constantly advancing system implementation technology, huge application backlogs and scarce system development resources — especially project time — a systems analysis technique must do more than produce specifications; it must be efficient.

Essential systems analysis is a requirements modeling technique that fills the bill. It is a set of strategies for expediting the development of system requirements models using the documentation tools of structured analysis.

One of the worst things that can happen to a project team is to become stuck in one phase of the development process, unable to complete it except by giving up at an arbitrary date and going on to the next phase with an unfinished product.

For example, a Fortune 500 manufacturing company has been redeveloping its order entry system for nine years. The decision was made to rebuild the system because it was technologically obsolete: a completely batch computer system using sequential tape files. Furthermore, the system was almost impossible to maintain, since the code was a tangle of undocumented assembler language.

Three years after the company started analyzing the system, the project manager reported that the specification was 80% complete, but

IN DEPTH/OF TIME AND ANALYSIS

that the team needed another year to finish it. Management, which could not wait any longer for results, demanded that the project manager forget completing the analysis and build a new system in that one year.

The project manager chose a narrow area within the original scope of the project and proceeded to develop a system to handle just that portion. Two years later, the new system was ready for testing. After a year and a half of testing, the manager decided that it was impossible to get the

The typical home remedy to analysis paralysis is to have the analysis team stop analysis with whatever it has at some arbitrarily set date and begin coding programs immediately. This decision is almost never well advised.

new system to do what it was supposed to do. Again, he decided to reduce the scope of the effort and start over. After another year of analysis, then a year and a half of design, programming and testing, this partial system was successfully installed. However, it couldn't solve more than 10% of the problem recognized nine years before.

Traditional system development techniques were used on this project. The analysis phase was intended to produce a 3,500-page narrative functional specification, while the system's design consisted of a single flowchart. Programmers invented the code spontaneously while pounding at a keypunch station.

In this case and in many other organizations, traditional approaches to system development have led to tremendous wastes of time. Primary among the time wasters are what I call analysis paralysis, systems installation runaround and modification cost inflation. These problems and their interrelationships are shown in the diagram on ID/1.

Analysis paralysis occurs when enormous amounts of time are spent in the analysis phase, resulting in volumes of useless documentation. The major reason for paralysis of analysis is an overly optimistic selection of project scope. The problem is compounded because no one knows what he should document as a requirement or how to tell if he has found all the requirements.

Poor documentation of the existing system adds to the

time it takes to specify the new system, as does using narrative text, the traditional documentation tool of systems analysis. The typical home remedy to analysis paralysis is to have the analysis team end analysis with whatever it has at some arbitrarily set date and begin coding programs immediately. This decision is almost never well advised. When you program software without understanding the system requirements, you pro-

duce a system that doesn't meet the user's expectations. That leads to the next major time trap in traditional system development.

Systems installation runaround occurs during the testing of software produced from a traditional requirements specification. In reviews of test results with the user, the development team finds that it omitted or misunderstood the user's requirements for the system. As the team tries to build the

correct features into the system, it usually finds more problems and more features that have to be added. While making these corrections, the programmers often introduce bugs into other parts of the software. More time is wasted identifying and fixing these bugs.

Eventually, managerial patience runs out. Management then decides whether the system should be scrapped or become operational despite its shortcom-

ings. More often than not, the makeshift system becomes operational. The new requirements that haven't been added yet become the first entries on the maintenance and modification list for the system. Coping with this list and with the more legitimate modification requests is the last major time trap, modification-cost inflation.

In most traditionally developed systems, it takes a lot of time to locate and fix

IN DEPTH/OF TIME AND ANALYSIS

errors or to add new features. The quick fixes slapped on during installation runaround have made the new system unnecessarily complex, inflating the costs of fixing or modifying it.

Also contributing to modification-cost inflation are the false requirements implemented in the system. These are requirements that reflect the obsolete technology of the system being replaced. By carrying forward fea-

tures of obsolete technology, the new system fails to make fullest use of the new technology. Since using new technology was probably the major impetus for the project, the false requirement problem is especially damaging. In addition, implementing these features makes the system unnecessarily complex.

Another cause of modification-cost inflation is bad program design. In fact, in many traditional develop-

ment efforts, no program design is done. Instead, programmers type in code directly from their reading of the analysis specifications. The typical result is tangled code, which makes modification planning much more unwieldy and time-consuming. Because of the tangle, the modifications themselves often cause problems within the programs. Finally, poorly designed programs are unreliable, requiring more attention when they

are put into operation.

Because of the many modifications that remain from the development effort, the unreliability of the system and the difficulty of making modifications, these systems gobble up resources that could otherwise be used to redevelop other systems. Under these circumstances, it doesn't take long before a system just installed is judged ready for redevelopment itself.

Meanwhile, for another

part of the organization, in another project, analysis paralysis is beginning all over again.

Failure to communicate

These hazards are primarily the result of communication problems. Basically, the problem is botched communication about what the system requirements are and how they will be implemented.

There are two types of communication failures: those between system developers and system implementation machines and those between system developers and everyone else.

System developers often write specifications for computer systems as if they were specifying systems to be implemented by humans. This means they leave out needed detail.

Programmers do their best to write correctly functioning programs from these specifications. If they lack the necessary detail to write part of a program, they either query those who wrote the specification or they guess at the detailed requirements. In the end, however, the systems developed from these specifications rarely meet the expectations of the user community. This leads to the systems installation runaround problem.

Once analysts realize that their specifications are inadequate, they react defensively. On their next projects, they try to specify every possible detail of the new system. This vacuum cleaner approach to requirements specifications helps cause analysis paralysis. While studying the existing system, analysts vacuum many of its obsolete technological features into the specification. These unnecessary features find their way into the new system, leading to unneeded complexity and unmaintainable software.

Distorted messages

Communication problems arise between users and analysts and among analysts, data base designers and program designers. When these parties rely on traditional documentation, the requirement message usually gets tremendously distorted, leading to a system that doesn't even come close to meeting the original requirements.

The traditional approach to documenting requirements is usually some combination of the developer's own memory, the spoken word and narrative documentation. Memory and the spoken word are obviously unreliable, and narrative specifications also have serious problems that prevent good communication: They are long and wordy and provide no effective high-level descriptions of the system,

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forcing the reader to get lost in details. In addition, the narrative form tangles the requirements so that the document cannot be read in small increments.

Finally, narrative documentation cannot clearly represent important relations between the activities in the system and between the system and the outside world. As a result, some of these relationships are omitted or stated redundantly.

Better modeling

The communication problem between system developers has been solved with a technique commonly known as structured analysis. This is a set of documentation tools and conventions for building better models of system requirements. Its central tool is the data flow diagram, which declares the existence of activities, data flows and data stores.

The diagram must be supported by two additional structured analysis tools that rigorously define the details of the activities, data flows and data stores. These two additional tools are the minispecification (a description of each activity) and the data dictionary.

Although structured analysis gets rave reviews for improving communication of complex requirements, it does not solve the problem of what to specify when developing automated systems. Projects using structured analysis encounter several difficulties when applying the technique.

Classical approach

The crucial managerial problem is that structured analysis takes too long. Although project teams have far superior documentation tools, they are still using the vacuum-cleaner approach to requirements gathering. That is, they document every feature of the system, just in case it is needed. Structured analysis paralysis is thus born, complete with a structured vacuum cleaner.

These problems are the legacy of the communication problems between people and machines. The people who try only structured analysis still have little idea of what they should specify to get the right system developed. However, structured analysis is indirectly making a major contribution to solving this problem. Having solved the problem of how to say it, system developers are identifying the more difficult problem of what to say in a requirements specification.

Structured analysis takes a step in this direction through its high-level procedure for building a specification. This procedure is based on the reasonable assumption that the major difference between the new system and the old is the technology used to carry out the system's activities.

Because the new system carries out much the same business policy as the old, the structured analysis procedure has analysts specify the relevant features of the old system before specifying the new features. The major break with the traditional approach is that systems developers must distinguish the logical and physical features of the system being specified.

Structured analysis defines "logical" to mean business policy and "physical" to mean a particular way of implementing business policy. In a customer billing system for a utility company, the procedure for deriving

The crucial managerial problem is that structured analysis takes too long. Although project teams have far superior documentation tools, they are still using the vacuum-cleaner approach to requirements gathering. That is, they document every feature of the system, just in case it is needed.

usage would be considered logical, while the computer and the auxiliary disk storage that implement this policy would be considered physical.

When studying the old system, two activities are performed: build a current physical model, and extract a current logical model from that current physical model by removing features that have to do with a particular implementation of a business policy. When specifying the new features of the future system, another two activities are performed: build any new business policy into the current logical model, and build a model that shows how that new business policy will be implemented (new physical model).

Building logical models prevents

the analyst from including obsolete technology in the requirements. More important, if the analyst tries to bypass the logical model by modeling functional and technological requirements together, the model will become so complex that some logical requirements will be overlooked and omitted.

The most prominent technical problem in using structured analysis is the difficulty of finding truly logical requirements. Practicing analysts are frustrated by the vague and subjective distinctions between logical aspects of a system and those considered aspects of systems implementation technology. Project teams frequently engage in prolonged, acrimonious and ultimately inconclusive debates on this issue. Then, upon finishing their models, analysts often wonder whether they have

succeeded in completely specifying logical requirements and leaving out irrelevant aspects of systems implementation technology.

Similar problems are encountered with determining the context of a system and the level of detail that should appear in a minispecification. When this confusion occurs, the typical response is to document more than needed to be on the safe side. The vacuum cleaner is started, and a ton of requirements — some legitimate, some not — are gathered and documented.

Since the problem is not how to represent requirements but what they really are, the first part of the solution is a framework that defines what should and should not be specified. This framework should define what the subject matter of systems analysis is. It should also explain the

Figure 1. Context diagram

typical logical and physical requirements of a system. Finally, it should state the level of detail required for effective system specification.

The second part of the solution is a set of basic strategies for applying both the tools of structured analysis and the new specification framework. With these strategies, system developers can spend their time developing systems instead of developing methodologies for developing systems. These strategies provide detailed guidance on the development of both logical and physical requirements models.

Essence of the technique

Essential systems analysis is a precise technique for defining system requirements. It defines what should be specified and provides a

set of strategies to develop a proper specification using the tools of structured analysis.

Systems development has a vocabulary of its own. Concepts such as "modular hierarchy," "data independence" and "third normal form" help system developers design programs and data bases. The system development vocabulary is richest by far in words that describe computer technology. Until essential systems analysis, the vocabulary for requirements definition was relatively small.

The essential systems analysis framework provides a terminology that allows better communication and concepts that help both analyst and user organize their understanding of complex sets of requirements.

The framework has a number of components. This article will focus on six of them: planned response systems, the types of system requirements, the perfect technology principle, the essence of a system, incarnation requirements and essential model partitioning themes.

Planned response systems. The essential systems analysis definition of what should be specified starts with a definition of what a system is.

A system responds to a select set of events that occur in its environment. For example, in a hotel, the wake-up system interacts with the hotel guests by accepting their wake-up call requests and waking them up at the proper time. The wake-up service responds to the event "Guest requests wake-up call."

Context diagrams reflect the interactive nature of systems (see Figure 1). The circle on the context diagram represents the system, or response mechanism. The rectangular boxes represent the entities in the environment with which the system interacts. Crossing the context are data flows representing the interactions the system has with its environment.

These interactive systems have two ways to respond to an event: an ad hoc way or a planned way. Ad hoc responses are made up after the event has occurred. The wake-up system does not expect a request that a guest be awakened with a marching band. However, if the guest were the CEO of the hotel chain, an ad hoc decision might be made to satisfy that request.

Planned responses are thought out in advance of the particular event. Once designated, these responses are executed every time the event occurs. The normal process of waking guests up at the appropriate time is an example of a planned response.

Essential systems analysis focuses on the planned response component of a system, which is appropriate for developing automated systems. Essential systems analysis calls this component the planned response system. By defining the planned response system, the technique helps avoid the problem of selecting an overly large project scope, since analysts will not waste time on ad hoc responses.

Two types of requirements. Having focused on the planned response system with an interactive system, the analysis defines the two major types of planned-response-system requirements: essential requirements and incarnation requirements. These two types of system requirements correspond roughly to what structured analysis calls logical and

Essential systems analysis uses the concept of perfect technology as a tool for distinguishing essential features. The essence of a system is the set of planned responses that would have to be carried out even if perfect technology were available.

physical requirements.

The essential requirements (also known as the essence of the system) are those features that are independent of the technology used to implement them. More specifically, the essence of a system is all the planned responses that would have to be executed regardless of the technology used to implement them. As an example, the Wake Up Guest activity would have to be carried out regardless of

whether the hotel uses people, computers or alarm clocks to provide the service.

The incarnation requirements (also known as the implementation of the system or of the essence) are those features that depend on the choice of technology. The planned responses executed by the system will be implemented using people, computers, manila folders, magnetic disk files, four-part forms, paper clips and so on. The selection of these com-

ponents and the integration with the essential features are the incarnation requirements.

Perfect technology. Essential systems analysis uses the concept of perfect technology as a tool for distinguishing essential features. The essence of a system is the set of planned responses that would have to be carried out even if perfect technology were available. With perfect technology, the most complex system could be implemented with a single perfect processor. A perfect processor costs nothing, does any task, handles any work load, works infinitely fast and never makes a mistake. The wake-up service can be used as an example of the application of the perfect technology principle.

The current implementation of the wake-up system is a human operator who takes the requests and a computer-driven tape system that delivers the calls. With perfect technology, one perfect processor could do all of the work. The operator in the current implementation of the system might record the wrong room number when a call is requested or forget to call the guest. However, mistakes like these are impossible with perfect technology. Such a system would also cost nothing, requiring neither capital expenditure nor paychecks.

The perfect technology concept was one of the first developments of essential systems analysis. After this concept was applied to enough systems, certain kinds of essential features emerged as being identical from one system to another. These standard essential features are fundamental activities, custodial activities and essential memory.

The essence of a system. Systems are created to serve some purpose or set of purposes. For example, the wake-up service exists to help guests make their scheduled appointments. The hotel hopes that this service will be a valuable convenience that will encourage guests to stay at the hotel again and again. Fundamental activities are those that directly accomplish the purpose of the system. In the wake-up service, the fundamental activity is Wake Up Guest. In a payroll system, one of the fundamental activities is Pay Worker. In a customer information system for a utility, one of the fundamental activities is Bill Customer.

Fundamental activities need information. In a payroll system, the fundamental activity Pay Worker requires the hours worked by an employee paid on an hourly basis, the wage rate and the deductions that should be taken out of the employee's paycheck. Some of this

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Figure 2. Wake-up system showing implementation-dependent features

information comes from the system's environment when the event to which the system is responding occurs. When the employee submits a time card, the system obtains the hours worked. Other pieces of information come from events and responses that occurred previously. This information is remembered in the system's essential memory.

Essential memory is the total information about past environmental events and system responses required by the fundamental activities of the system. In the wake-up service, the Wake Guest Up activity requires information identifying the guest and the time of the wake-up call. In a typical case, this information is presented to the system hours before the wake-up call will be made. The system must remember it so that it will be available when the fundamental activity needs it.

The need for essential memory leads to the last essential component: custodial activities. Custodial activities are the activities that create, modify and delete essential memory. Their job is to keep the essential memory up-to-date so that it will be appropriate for the fundamental activities. In the wake-up service, Record Wake-Up-Request is a custodial activity. It records the guest who requested the wake-up call and the time that the call should be placed.

Typical incarnation requirements. The essential systems analysis framework also helps system developers distinguish essential features by showing them what system components are not essence. That is, it identifies the implementation-dependent features that are part of most real systems. These features result from the use of imperfect technology, which costs money, has limited capability and capacity and makes mistakes. Developers can recognize these nonessential features and remove them from essential models.

The major implementation-dependent features of systems are illustrated in Figure 2. This figure shows the wake-up system as it might look in a typical hotel. Notice first that the essential activities have been fragmented and allocated to four different processors. Fragmentation of this sort is a major implementation-dependent feature. How the essential activities are fragmented depends on the capabilities and capacities of the processors used in the system.

Some activities in Figure 2 exist simply to transport data from one processor to another (for example, Answer Phone and Enter CRT Transaction). They make it possible for processors executing fragments of the same essential activity to communicate. Essential systems analysis calls these activities the infrastructure of the system since they are like transportation systems that ship goods to different markets. Instead of goods, however, the system's infrastructure ships data. The layout of the infrastructure depends on the particular fragmentation and allocation of essential activities in a given system.

Finally, Verify Call in Figure 2 is an example of an activity that protects the system against the fallibility of its technology. Because a real implemented system makes errors, it has activities that detect, correct and prevent those errors. Essential systems analysis calls these activities the administration of the system. The administration ensures that the system will execute the proper essential responses. The administration is dependent on the particular kinds of mistakes a given system can make.

Essential model partitioning

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themes. Analysts need to partition the system into chunks so that the specification reader never has to absorb too much at once. Although a proper partitioning can be represented with the tools of structured analysis, that partitioning cannot be derived by the tools themselves. Instead, the essential modeler must decide on how the essential activities and memory should be partitioned.

There are an infinite number of ways to partition essence, but many of them are unacceptable; they either obscure the true essential requirements or introduce false essential requirements. Yet, analysts typically choose a bad partitioning of essence because structured analysis offers them little guidance.

To solve this problem, essential systems analysis proposes the use of partitioning themes. A partitioning theme is a precisely defined way to partition essential features that does not introduce bias toward a certain technology. We have two partitioning themes: event partitioning for activities and object partitioning for memory.

The planned response system responds to events in that system's environment. With event partitioning, all activities that would have to be carried out in response to one event are placed in a single activity called an essential activity. Each event to which the system responds has a corresponding essential activity. Figure 3 shows the essential activities in the wake-up system. Since the wake-up system responds to two events, "Guest requests wake-up call" and "Time to wake guest up," its essential model contains two essential activities.

The data in essential memory describes the characteristics of either real or artificial things called objects.

In a customer billing system for a utility, data would be remembered about the real objects "customer" and "meter" and about the artificial objects "account" and "meter reading." With object partitioning, all data elements that partially describe a particular object are grouped together. The result is called an object data store. Essential memory is partitioned into one object data store for each object about which the system needs to store information. Figure 4 (on ID/10) shows the object-partitioned essential memory of a simplified customer billing system.

The components of the essential systems analysis framework categorize both the implementation-technology-dependent and implementation-technology-independent features of a system and provide a language for communicating about these features. The framework organizes the system into understandable chunks, thereby making a complex system accessible. By eliminating much of the confusion and ambiguity concerning what should be specified, the framework eliminates the need for a vacuum-cleaner approach to analysis. The result is more efficient and effective system development.

The essential systems analysis framework has proven to be successful in helping system developers distinguish and define both essential and incarnation requirements.

Analysis strategies

From using the essential systems analysis framework on numerous system development efforts, Steve

McMenamin and I have developed two different types of systems development strategies: technical strategies and managerial strategies.

The technical strategies ignore the real-world constraints that affect most projects. Project deadlines, personnel shortages, lack of automated system development tools and quality assurance problems are irrelevant to the technical strategies. Instead, each technical strategy states only system development activities that must be carried out regardless of particular management constraints.

The managerial strategies are technical strategies reorganized to face real-world constraints, the most important of which is time pressure. Managerial strategies state how to carry out technical strategies in order to minimize the time needed to
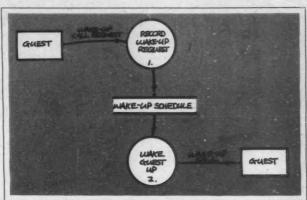
Figure 3. Essential activities

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develop the system.

System developers benefit from having the two strategies separate. The technical strategies convey an understanding of essential system development activities that is impossible to achieve without factoring out the complications of the real world. Without these constraints to worry about, there are fewer activities, and those that remain can be ordered in the way that makes most sense.

Once the technical strategies are understood, the managerial strategies protect the analyst from the dangers of naivete and remove the need for him to adapt the technical strategies to the real world. Because the technical activities have already been explained, the managerial strategies can concentrate on coping with constraints.

The technical strategies

The overall technical strategy has three essential activities: Define Essence, Select Incarnation and Build System. The first two essential activities each produce a model of one type of system requirements. Define Essence produces an essential requirements model, while Select Incarnation produces an incarnation requirements model. The last essential system development activity, Build System, is the activity that translates the system requirements model into a functioning system.

The high-level technical strategy has no quality assurance checkpoints and makes no reference to organizational units like system de-

Figure 4. Object-partitioned essential memory for billing system

velopment or data administration departments. Quality assurance checkpoints, although absolutely necessary in the real world, have been removed to streamline the technical strategy. Assignment of activities to organizational units — again, a necessity in the real world — is not specified so that arguments over who does what can be avoided until

everyone knows what the group, as a whole, must do.

In addition, the high-level technical strategy makes no mention of traditional system development activities like analysis and design. There are so many different definitions of what activities constitute analysis and design that these terms have become almost meaningless.

Finally, no project planning or control is reflected in a high-level technical strategy. Since for the moment we assume there are infinite resources (both people resources and time), there is no need for developing a plan to husband them economically.
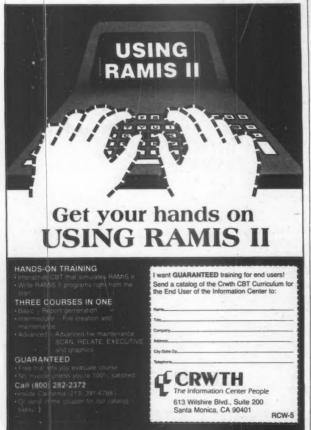
The first step in the technical strategy is defining essence. It results in a structured analysis model that specifies the essential activities and memory of a new system down to the data element level.

There are two alternative strategies for executing the Define Essence activities. One strategy is to define essence from scratch, and the other is to derive an essential "base" from some existing system and add an essential increment to that base.
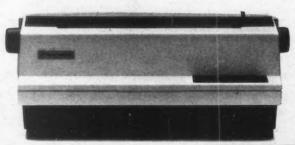
When essence is derived from scratch, it is created directly from knowledge of a system's environment. This strategy is required when the essence of the new system is different from the essences of all known systems or when information about similar essence is unavailable.

There are two activities in this strategy: Create Individual Essential Activities and Create an Integrated Essence. Because the interaction between essential activities is often complex, it is easier and safer to create each essential activity individually first. Once enough of them are defined in isolation, then the essential activities are connected to each other.

The more commonly used strategy is the base/increment strategy. In this approach, system developers

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From the current implementation model, developers derive an essential model of the existing system. They restructure the current implementation model to resemble the essential model's structure as closely as possible.

"back into" the definition of the new system's essence. First, the essence of an existing system that is close to that of the new system is modeled. This model provides a base of essential features for the new system. The new essential features are then created and added to the model of the existing system's essence.

System developers also back into the model of the existing system's essence. First, a model of the existing incarnation, a model that shows how the technology of the current system implements essential features, is built. The current implementation model is the opposite in structure from the current essential model. In the former, the essential activities and memory are fragmented and assigned to many different computers, people and organizations. In the latter, the activities and memory are whole and are partitioned according to events and objects.

From the current implementation model, developers derive an essential model of the existing system. They restructure the current implementation model to resemble as closely as possible the structure of the essential model. The model of the current systems implementation is necessary for two reasons. First, often the only way to find existing essential features is to model them first within their technological hiding place. Second, even if these essential features could be derived directly, they have to be verified by others who know the existing system. To be able to confirm current essential features, these people may require a model that looks like the system they know.

Three essential activities make up the strategy for deriving a current essential model: Find the Fragments of Essential Activities, Model Each Essential Activity and Integrate the Essential Activity Models. The last two activities are similar to the activities in creating essence from scratch. In both cases, essential activities are modeled individually, and connecting the activities is deferred until the next step.

Select incarnation

As in defining essence, there are two strategies for selecting an incarnation. Also as in defining essence, there is a strategy for defining the incarnation model from scratch and a strategy for deriving an incarnation based on an existing incarnation.

Many projects implement a system's essence using a radically different form of system implementation technology from that of the existing system. They may be building an organization's first data base system. These projects have to create a new configuration of technological components.

An incarnation model is created by four activities. In the first activity, the processors (people and computers) are selected. It is here that decisions are made about which activities or pieces of activities a given

person or computer should carry out. The result of this step is a model of the processors selected for the new incarnation and their activity assignments. In the next two steps, the infrastructure and administration for the new system are created and modeled.

Many projects implement a system's essence with a technological environment already in use within an organization. For example, the

firm may have many systems already running on a large mainframe with on-line access and data base management system file implementation, and the project at hand must use this environment when the new system is installed. The strategy would require a new first step: an activity to assess the target implementation environment.

The managerial strategies

The managerial stategies of essential systems analysis are designed to help speed the development of systems without sacrificing quality. These strategies are based on a common premise: Knowledge of the dimensions of system development work on a particular project must be obtained before resources are committed to do that work. You wouldn't want a project team to work for six months before realizing that the project either is too big, addresses the wrong problem, works toward the wrong solution or uses an inappropriate approach. In each case, great amounts of precious system development time are lost.

Each managerial strategy has the project team establish the dimensions of system development work remaining. In the process, the team can check to see if the selection of problem, solution or approach is appropriate. Early detection of problems will allow project management to revise plans without wasting time.

In the first activity of the overall managerial strategy, the essential systems analysis framework and the tools of structured analysis are used to produce high-level models of the new system. By building these models, a project team can learn the type and amount of project work required to complete the development effort. These models are then used to develop a working prototype of certain system requirements. In the remaining activities of the strategy, these high-level models are completed, and a complete system is built.

At a more detailed level, the Model System (high-level) activity consists of three subactivities: Blitz an Essential Model, Blitz an Incarnation Model and Develop a System Prototype. Blitzing refers to the rapid development of a model just complete enough for estimating purposes. When gauging the dimensions of a system development effort, it is important to assess the work that must be done to define both kinds of system requirements. Therefore, a high-level model of each type of requirement for the new system should be developed. The three lower-level activities that make up the Model and Implement System (detailed) activity are, naturally enough, Compile the Essential Model, Complete the Incarnation Model and Complete System Construction.

Expedite development

The framework and strategies of essential systems analysis help expedite the process of system development. The essential systems analysis framework helps analysts avoid false requirements that would paralyze the analysis effort and lead to systems installation runaround and modification-cost inflation. It also tells what should be specified when exporting a system to an automated implementation environment.

The technical strategies of essential systems analysis help developers speed up their work by showing them how to build both essential and implementation requirements models. The managerial strategies optimize system development by providing the dimensions of the effort up front. Using this information, project managers can develop a plan that makes best use of available resources.

Traditional development methods add to the difficulties of trying to stay technologically current. These methods create a vicious cycle of time traps that ultimately lead to system development gridlock. The modern approaches of structured analysis and essential systems analysis go a long way toward expediting the system development process. Both techniques solve the kinds of communication problems that can slow projects to a crawl.

About the author

John F. Palmer is one of the founders of the Atlantic Systems Guild in New York and a main architect of the Yourdon structured analysis technique.

Prior to his association with the Guild, Palmer was a systems analyst at a major New York State bank and a consultant at Yourdon. He now consults in the areas of project management, systems analysis and data modeling.

IN DEPTH

ILLUSTRATION BY T.M. BARRETT

Are the risks worth taking?

Integrating information services jeopardizes the resources of the company as well as the reputation of the information systems executive. Here's how to measure risk vs. return.

By M. Victor Janulaitis

An executive of a large western bank described his dilemma recently:

"Every time I turn around, our vice-president of information systems is coming into my office with another proposal — a million dollars for some new word processing and computer equipment, $85,000 for an updated software package or, as I have sitting on my desk now, a multi-million-dollar proposal for installing an advanced worldwide telecommunications network. I am inclined to look favorably on these proposals, since our past ventures into information services generally have been successful. Interestingly, however, virtually every department in the bank also has some complaint about our current systems. What bothers me is that my intuition is not as sharp in computers and communications as it is in lending, borrowing, site location and other traditional banking areas.

"Today, electronics is a necessary part of our business. The fine line between products and services has disappeared as our bank has become more computer-based. In this age of deregulation and advancing technology, I cannot imagine running our bank without office automation, computers and communications networks. In addition, we must continue to advance in these areas if we want to stay even with or get ahead of our competitors."

Integrating information services technology involves risk. Many managers feel risk is something to be avoided. They are satisfied with the low rates of return they receive because they assume minimal risk.

The questions the business executive wants answered are: "Why should our organization take the risks associated with integrating information services?" and "What is an acceptable

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level of risk?" The response to these questions is, you do it in order to gain a competitive advantage consistent with the level of risk you can successfully manage. The challenge is to develop a strategic plan for achieving this objective.

Competitive strategy rests on five forces:

1. The relative bargaining power of buyers/customers.

2. The relative bargaining power of suppliers.

3. The rivalry among ex-

isting firms.

4. The threat of new entrants.

5. The threat of substitute products or services.

Information services technology has helped some organizations to gain competitive advantage in each of these five dimensions. The Wizard System, for example, helped Avis improve the product and service it delivered to its customer. The system provided Avis with information about the location, cost and

performance of its fleet. This information helped Avis to bargain more effectively with its suppliers. It gave Avis an advantage over Hertz, National and the other car rental firms.

The national network and the service levels it established "upped the ante" for getting into the business and served as a barrier to entry.

In addition, the Wizard System improved the cost/performance ratios and forestalled the development of

substitutes.

There are several distinct categories of information services organizations that can be grouped into three generic sets. Every organization typically has some characteristics of each set, but for the most part, favors one of the three:

Strategic-technology-directed — Information services are an integral part of the organization's unique strategy. This type of organization has an experience

base that allows it to be involved with most leading-edge technology and spends significantly more than its nonstrategic-technology-directed competitors on data processing.

One of the interesting characteristics of this type of organization is the long tenure of the senior management team — including the information services organization. Some industries are technology-directed (airlines in the 1960s, national hotel and car rental industries in the '70s and the retail and financial services industries in the '80s).

Business-directed — Information services are used to provide the necessary information support for its key strategic business units. This type of organization has an experience base that will allow it to be involved with one new technology at a time, for example, data base. The senior management team does not push its information services group to be first in the application of technology. Rather, the team wants to be sure the organization can do anything its competition can do within a reasonable period of time.

This organization typically goes through the standard sets of confrontations within its structure and establishes priorities.

In addition, multiple centers of power and expertise compete for authority in establishing, implementing and controlling technological direction in the organization.

Manager-directed — Information services are used to provide information for basic management functions such as production, accounting, finance and marketing. This type of organization has a very limited experience base and only takes on new technology when it is forced to. Typically, there is one key decision maker who is not in favor of computer or communications technology. One such organization had a president who was proud of the fact that he had "unplugged" all the computers in the organization, and it was still profitable.

In this type of organization, if a manager can justify an application of computer technology he is the one who goes to bat for it. The typical application portfolio for this organization is focused on operational control types of applications and is moving toward the implementation of management control applications. I estimate that between 15% to 20% of corporations fall into this category.

Gaining an edge

How can an organization gain a competitive advantage through information services? The following five steps help:

■ Assess the techno-

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IN DEPTH/WORTH THE RISKS?

Industry • Major Functions	Technology								
	Dependence			Maturity			Absorption rate		
	Low	Average	High	Low	Average	High	Low	Average	High
Travel • Airline • Hotel • Rent-a-car									
Manufacturing • Planning (MRP) • Design • Robotics									
Retail • Electronic cash register • Point of sale									
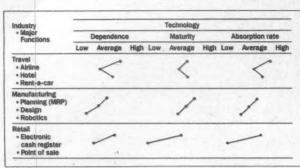
Figure 1. Absorption rate of three industries

logical absorption rate and status of the industry.

■ Measure and plot the risk/change relationship for the organization.

■ Develop the organizational probability of success ratio (PSR) profile factors and measurements.

■ Measure and plot the organizational risk/PSR.

■ Develop the organizational risk management action steps.

One of the factors that many information system managers tend to overlook is the current level and dependence on information services technology in their industry. This industry absorption rate dictates the overall risk the organization faces from changes caused by information services technology.

The absorption rate is based on two factors. The first factor is dependence — the depth to which technology is an essential component of the industry. The level of dependence can be determined by asking the question: What would happen if the plug was pulled on all information technology in the industry today? Maturity is the second factor —

the extent and sophistication with which the industry has adopted the technology. The level of maturity can be determined by asking the question: How close to the leading edge of information services technology is the industry?

The combined effect of these two factors reveals the breadth and depth of technology absorption in the industry. A high absorption rate generally implies that the information services in the industry are strategic technology directed (Figure 1).

The steps to develop a chart like Figure 1 are: identify the industry's major information and communications functions; rate them as to maturity and dependence; and plot the organization's position relative to the industry. The following questions should then be asked:

■ What are the applications of computers and communications in the industry today and in the future?

■ What is the combined absorption rate for the industry?

■ What are the direction, pace and momentum of technological change within the industry and the organization?

■ Is the organization behind or ahead of the industry in its application of technology?

■ Are there opportunities to gain a meaningful competitive advantage by leading the industry in information services applications?

■ Can we employ the technology to support a unique strategic thrust of the organization?

The result is a list of potential technological directions that will give the organization a leadership position or enable it to gain parity within the industry. Either of these results will entail changes in the organization and, thus, increase its exposure to risk. To assist in managing this process, the next step is executed.

Risk/change ratio

A successful strategy must achieve a proper balance between growth, control and technological innovation. Executives need to know the potential bottom line impact of the application of information services technology. The following questions are useful in this regard:

■ What is the current strategy for information services?

■ Have the technologies we use paid off?

■ Do they support the business or drain its resources?

■ How do we compare with our competition?
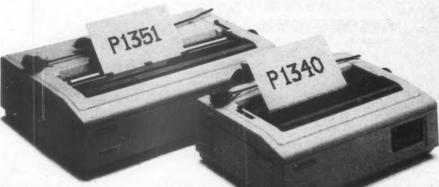
■ Are we spending the right amount (too much or too little)?

Many factors affect the answers to these questions. Included are the technological dependence and maturity (absorption rate) of the industry and the organization; the focus of the organization's application systems — operational control, management control, strategic planning or decision support systems; the organizational maturity of the computer, communications, user and management team; the internal performance measurement systems of the organization; and the existing direction, pace and momentum of implementation.

Figure 2 shows the plot of a Fortune 500 company at the point when a new information systems management team was put in place (time x) and the same organization 24 months later (time y). In that 24-month

IN DEPTH/WORTH THE RISKS?

period the organization went through significant change. The vice-president of information systems started to implement a new communications system within his company's field operations, converted from an early '70s-based computer operation to an '80s approach, revised the major business and information reporting systems and developed a new charter and role direction for the information services groups within the organization.

Case history

An initial analysis, utilizing the critical success factors approach, can identify four to eight items that have to go well for the organization to be successful. Here is a case history: A billion dollar organization had undergone a number of significant organizational changes. A new chief executive officer was installed, and several new strategic decisions were made.

Among these was the decision to utilize information services technology to provide the corporation with a meaningful competitive advantage. The successful information systems executive immediately started to change the way the organization related to the information services group and the MIS budget increased by more than 45%. However, new concerns were identified by the information systems executive, including:

■ Senior management did not understand or support the MIS plans for computer hardware, operating systems, data bases, communications network and facilities.

■ The status of four major development projects, which accounted for more than 35% of the salaries in the current budget, was not known.

■ The decision to utilize outside contractors to modify existing software resulted in a substantial expense during the prior four months.

■ Several key weaknesses of the MIS organization and key user organizations were revealed. The main concern was the high turnover rate of important specialists.

With this information the information systems executive was able to identify six profile factors. They were: (1) a strong information services management and delivery team; (2) a high independence from external contractors; (3) a measured growth of MIS technology; (4) a successful modification of the user organizations' operational characteristics; (5) a well-implemented system development, implementation and operational methodology; and (6) a new capital prioritization, budgeting and monitoring system.

Figure 3 provided an excellent communications vehicle showing where the executive's efforts had to be placed in order to minimize risk and to increase the probability of success. For example, although the information services team was experienced, it had not been with the organization long enough to absorb fully its culture. This resulted in an overall rating that was negative. The need for independence from the outside was the greatest problem. On the other hand, technological growth was normal, and the rate of change was within the overall optimal band.

Overall change management was low risk for the organization because a number of positive steps had been taken. The development methodology was at a normal level of risk, as was the capital budgeting, because of the control systems that had been put in place by the new information systems executive. These factors were then measured across all of the
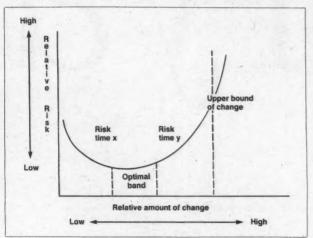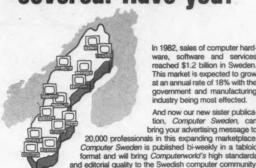
Figure 2. Risk/change relationship

Critical success factor measurement	Score	PSR profile		
		Worst (-1)	Even (0)	Best (+1)
MIS team	-0.1			
Independence	-1.0			
Technology growth	0.0			
Change management	0.3			
Development methodology	0.0			
Capital budgeting	0.2			
Summation	-0.6			

Figure 3. Summary organizational PSR profile

3M intr
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IN DEPTH/WORTH THE RISKS?
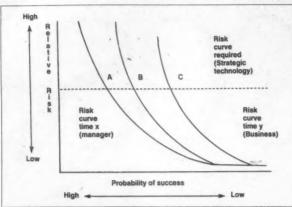
Figure 4. Probability of success

activities with which the organization was involved.

The information systems executive can develop a probability of success profile for his organization. Looking at the risk curve in Figure 4 for time x (manager directed), the relative risk (horizontal line) at point A is the same as the risk of point B (business directed) and point C (strategic technology directed). The area of difference is the probability of success. For the same level of risk the probability of success is greater for the strategic-directed organization than for the manager-directed one.

In Figure 4, the organization was initially manager directed. You can see the direction that this organization took. With its previous management team (manager directed), the information services group did not

acquire the experience base needed to accomplish the company's objectives. For example, there were three failures in two years trying to implement a relatively simple distribution inventory control system. The company improved its position by adopting a business-directed strategy that helped it to relate inventory control problems more closely to strategic business units. The difficulty the company must now face is that its corporate objectives require it to become a strategic technology-directed organization and to use information technology to gain customer service advantage over competitors. This shift in strategy should also improve its probability of success.

With these factors considered, it is a reasonable task for an information systems executive to define the set of action steps required for his organization to gain competitive advantage. First, the executive needs to look at the absorption rate and review the systems that are the focus of the "future leading competitors."

This data can identify the new services a financial services organization is going to provide, the new products an office automation company plans to implement or the new directions a manufacturing or distribution organization can take to improve productivity. From this, a plan for the information services function can be created.

The information systems executive can identify his organization's risk/change function and identify the direction, pace and momentum necessary to achieve its plan. By reviewing the individual activities of the information services function, the executive can then identify specific steps required to change its PSR profile and meet its objectives.

Vice-presidents of information systems can succeed and help their organizations achieve a meaningful competitive advantage by developing a business strategy based on information services technology. This advantage can be translated into new market opportunities as well as the traditional cost-reduction systems.

For example, any information systems executive who looks only at a "simple" application of office automation and does not see potential new ways for linking it to the business strategy or his basic business units functions may be missing an opportunity. Companies that have prospered in these difficult times, for the most part, have been innovators. Many of them have implemented innovations in the information services area.

The process presented here is straightforward. The ideas are little more than a new application of good management practices. If you are to succeed in the next decade, you will need to manage risk, reward and probability of success.

About the author

M. Victor Janulaitis is president and founder of Positive Support Review, a Los Angeles-based management consulting firm specializing in technology and change management, risk assessments and information systems for Fortune 500 corporations. He has co-authored Managing the System Development Process. *As an executive at IBM, Janulaitis helped develop the initial marketing programs for the IBM 370.*

IN DEPTH

Information on the bottom line

By David R. Vincent
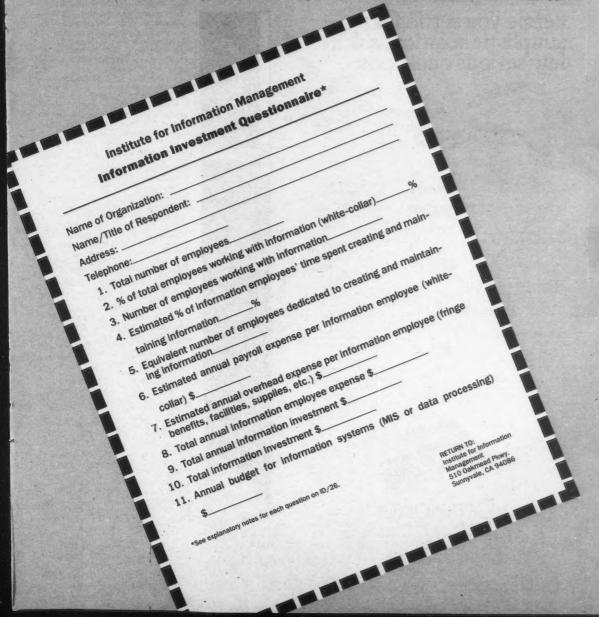
Information should be considered an economic commodity. In order for the information to be treated as a balance sheet corporate asset, its value must be clearly demonstrated. Investing in information must be shown to yield future revenues, a difficult point to prove. Evidence suggests that information systems play a key role in making information valuable.

The information investment, depending on the kind of industry, is actually much larger than estimated in my original In Depth article [CW, Sept. 26, 1983]. The new findings come from a survey of industries driven by information (banks, insurance companies and service organi-

zations) as well as manufacturing-based organizations.

The ratio of the information investment to the annual hardware/software expense relates somewhat to industry type. This ratio has value-added implications.

The questionnaire below was mailed to more than 2,000 chief executive officers. The net information investment was achieved by combining the total number of employees, the percentage of total employees working with information, the estimated percentage of information employees' time spent creating and maintaining information, personnel and related expenses such as benefits, payroll taxes, office costs and others listed in the questionnaire. The typical

Institute for Information Management
Information Investment Questionnaire*

Name of Organization: _____ %

Name/Title of Respondent: _____

Address: _____

Telephone: _____

1. Total number of employees _____

2. % of total employees working with information (white-collar) _____

3. Number of employees working with information _____

4. Estimated % of information employees' time spent creating and maintaining information _____ %

5. Equivalent number of employees dedicated to creating and maintaining information _____

6. Estimated annual payroll expense per information employee (white-collar) $ _____

7. Estimated annual overhead expense per information employee (fringe benefits, facilities, supplies, etc.) $ _____

8. Total annual information employee expense $ _____

9. Total annual information investment $ _____

10. Total information investment $ _____

11. Annual budget for information systems (MIS or data processing) $ _____

*See explanatory notes for each question on ID/26.

RETURN TO:
Institute for Information
Management
510 Oakmead Pkwy.
Sunnyvale, CA 94086

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information worker salary was about $20,000 to $25,000, with the related costs running from 80% to 100% of salary. These figures are especially significant when two-thirds of the labor force may be employed as information workers over the next five years (Table 1). With a gross national product (GNP) of about $3 trillion and gross national income of about $2.7 trillion, that means that $2.1 trillion, or more than one-third of the GNP, is being spent on information work.

Adam Smith's theory of economics, which traditionally views agriculture, manufacturing and service as the three labor divisions, must be modified to add a fourth: information. By lumping together pizza chefs, bank presidents and information workers, economists present a very warped and often dismal view

of our economy. Many even predict that we will become a nation of lazy "Big Mac" consumers rather than work hard to be more productive in those industries that can reduce our balance of payments deficit. Nothing could be further from the truth — Silicon Valleys, Gulches and Prairies are springing up where relatively poor rural economies existed previously.

What is worse, economists ignore the impact of the information revolution. My concept of information economics recognizes the traditional components of current and fixed economic assets. However, as the labor force moves into information-intensive work, a new fundament for information investment must be used to make sound national policy based on the new labor utilization.

I am not suggesting that the U.S.

will produce fewer automobiles or basic materials as John Naisbitt suggests in *Megatrends*. I am saying that the labor component that has been required to produce manufactured goods will atrophy — a result of the automation that must take place to allow U.S.-produced goods to compete in a world economy with cheap local labor.

Consequently, exports from the

U.S. will contain a high element of technology, which can only be a result of redeployment of an adequately trained labor force. The current social upheaval and unemployment is, in part, due to this longer range redeployment.

Impact of shift

This shift from an industrial economy to an information-based economy will have a major impact on the way that labor is utilized and the way that information-oriented output is valued. In the manufacturing environment, labor has traditionally been included in the cost of goods sold. Therefore, labor is matched by the inventory process with cash flow as manufactured goods are sold. This accounting reinforces the management emphasis on reducing the labor component in goods manufactured in the U.S. so that exports can compete in the world market.

On the other hand, the increasing investment in information workers (and equipment, facilities and so on) is treated as a routine expense item and is neither inventoried nor capitalized as is labor in the manufacturing environment.

Consequently, the benefits to be realized from the information

	1990	1980	1930	1870	1850
Agriculture	3%	4%	40%	65%	70%
Manufacturing	15	30	40	15	10
Service	15	15	15	12	15
Information	67	51	5	5	5
Total	100%	100%	100%	100%	100%

Table 1. Labor utilization

Note: If exact figures not available, supply estimated range.
1. Total number of employees includes all on payroll (including executive management).
2. Information employees generally include all personnel involved in the following areas: administrative; executive; marketing; manufacturing personnel involved with management, shipping, inventory and order entry; sales; engineering; finance; planning and control.
3. Multiply Items 1 and 2.
4. A rule of thumb for the effort dedicated to creating and maintaining information is 40% to 90% of total information employees' time, depending on the businesses' dependency on information.
5. Multiply Items 3 and 4.
6. Estimate the average annual salary per information employee (white-collar).
7. The associated overhead includes all fringes, Fica, office space and facilities, supplies, education, travel and communications. These generally run 80% to 120% of the base salary.
8. Sum Items 6 and 7.
9. Multiply Items 5 and 8.
10. It generally takes three to seven years to create a full information base. A rule of thumb is five years. Multiply the figure in item 9 by the number of years invested.
11. The annual information systems budget (excluding payroll expenses).

Rules of thumb for questionnaire

IN DEPTH/BOTTOM LINE

investment may or may not be matched with revenue. This causes management to make decisions based on a profit squeeze in the current period and discourages management from investing in proper, top-down, decision-oriented, information-based systems that will favorably impact the return on investment over time.

The net result is that information-based systems are typically implemented on a piecemeal, ad hoc basis with little thought to the real value of the long-term information investment. A current example of such dubious accounting practice is the expensing of all software development in the current period — disregarding the fact that the application (or marketable product) may have substantial impact on future cash flows, yet little or no current benefit.

This extreme conservatism on the part of the accounting community is analogous to the expensing of all manufacturing labor in the current period, even though substantial inventories may be built for sale in future fiscal periods, and extensive plants and facilities may be built for future use. The discipline of analysis and valuation of the information investment (as with other traditional assets) is the basis for information economics.

Stored information

In a recent study, Kodak Corp. claimed that there are 21 trillion pages of information stored in desks, files and archives. This information is *not* automated. The annual growth rate for this kind of stored "information" is about 20%. If this is the way that the information investment is being made available to information workers, then it is no wonder that the accounting community can't place a value on it. The value of information can only be determined when it contributes to organizational productivity. This can only be done with automated information systems.

Not all information has value. If information doesn't satisfy the need of the information worker in the productive performance of tasks critical to the larger organization, it is worthless. Too much information can be worse than not enough. How might a company go about determining if it is spending the right amount on information systems or too much on information — in other words, does it have too many information-generating workers?

The goal of the research described in this article is intended to start the process of answering this question. Those companies wishing to participate and receive in-

dustry-specific results may complete the questionnaire on ID/26 and return it to Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Of 2,000 questionnaires sent out, only a small percentage were returned, some completed, some with just a note that this information was not available or that it would take significant study to develop such statistics. I interpret this to mean that

top management is unaware of the implications of information work.

A total of about 50 completed questionnaires were received. Some could not be used because of missing data elements. One had calculated an information investment of $273 million with a mere $90,000 spent on information systems. This yields a ratio of more than 3,000:1 (the amount reported wasn't enough to produce the payroll; obviously, much of the

> *An example of such dubious accounting practice is the expensing of all software development in the current period — disregarding the fact that the application may have substantial impact on future cash flows, yet little or no current benefit.*

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information systems expense is buried in such things as banking services).

Another 41 companies sent their annual report, allowing some additional observations to be made coupled with interviews with their senior management. Like many research projects, the pure "scientific method" did not lend itself easily to conducting the study. Therefore, a fair amount of conjecture and intuition were used in evaluating the results.

Not all information has value. If information doesn't satisfy the needs of the information worker in the productive performance of tasks critical to the larger organization, it is worthless.

These are often called "partly baked ideas." At least they are a start in an area of investment that so far has been almost entirely ignored.

The results were dramatic. Some companies reported that as much as 80% of their payroll and related overhead costs were spent on creating and maintaining information. One of the world's most successful information-driven manufacturing companies estimated that its information investment might be as high as $45 billion.

Due to the confidentiality of the survey information, specific companies are not listed in the findings. Rather, the results were combined into two basic categories. As more responses are received, industry-specific statistics will be more meaningful. The two basic categories are:

1. Information-driven companies. These include banks, insurance and service firms and two information-driven companies that include significant manufacturing of information equipment and software.

2. Manufacturing companies. Even though there are some significant companies that stand apart from the norm of manufacturing, there was enough consistency to include all of them as a group.

Other studies

The responses from the questionnaires were consistent with a study done several years ago that appeared in *MIS Quarterly*, September 1981. In this paper, Franz Edelman, who was then RCA's vice-president, Business Systems and Analysis, put forth some statistics from RCA concerning the cost of information.

The study, conducted in 1978, was confined to RCA and took a slightly different view of the "information worker" from those currently used by John Naisbitt in *Megatrends* or Alvin Toffler in *The Third Wave.* However, Edelman's statistics were easily modified to resemble more closely the approach taken here.

An even earlier study was conducted by Paul A. Strassman. Titled "Managing the costs of information," it was published in the *Harvard Business Review,* September-October 1976. In this study, the ratio of information investment to the annual expense of DP ran about 88:1 based on some restructuring of the data. This is consistent with the fact that at that time most systems were purely production batch-oriented.

In Edelman's 1978 study, the statistics for RCA indicated a ratio of about 53:1 based on some restructuring of the data to match the methodology used in this article. RCA at that time had moved into the interactive systems mode for some of its applications. However, RCA was at the beginning of this endeavor, and significant changes were anticipated. Edelman retired shortly thereafter, and more recent statistics are not available.

In summary, Edelman's and Strassman's studies showed that in the 1970s, information systems investment had been 88 and 53 times the hardware/software annual expense, respectively.

The results of the survey, shown in Table 2 on ID/30, included 27 valid responses, 11 from information-driven industries and 16 from manufacturing-based organizations. Although this is a very small sample, the results

IN DEPTH/BOTTOM LINE

indicated a trend in the ratio between the amount invested in information and the annual expenditure on hardware and software. Of the companies responding to the survey, the following are the summary results:

Table 3 was based on a much larger sample size and includes the survey respondents and where the information investment was calculated; the information systems budget was not available.

Major influence

These large investment numbers were influenced heavily by two major information-driven firms that had $15 billion and $45 billion invested in information respectively. On an informal basis, the ratio between these figures and those of the information systems annual budget

were comparable to the ratios calculated from the survey results.

The manufacturing side was similarly influenced by four firms with an investment in the $5 billion range. Again, on an informal basis, their management indicated that the ratios from the survey sample reflected approximately their ratios.

The first step toward determining the value of the information investment is ascertaining the business reason for the collection of information. The second step is to assess the ability of the information-handling system to provide the right information (as determined by the first step) at the right place, at the right time, in the right form and in the right quality.

The degree to which these two steps are satisfied in the key areas that determine success or failure of

	Information-driven industries	Manufacturing industries
Average information investment Annual expense	17.6:1	35.7:1
One standard deviation	11.8	25.7
Number of companies	11	16
Average information investment	$200 million	$850 million

Table 2. Information investment vs. annual information budget

	Information-driven industries	Manufacturing industries
Average information investment	$4,200 million	$1,200 million
Number of companies	37	31

Table 3. Average information investment

an enterprise must be assessed. Ultimately, the value of the information investment and the added value provided by information systems can be derived by measurement of resultant future cash flow.

Some industry sectors are especially driven by information. Specifically, their only product is a service. These are the firms that were designated as "information-driven" companies in the survey results. They include:

■ Banking and financial services.
■ Insurance and security services.
■ Most government agencies.
■ Marketing and sales organizations.
■ Accounting and auditing firms.
■ Software development firms.
■ Investment houses.

The most common characteristic of all the above businesses is that their end product is based on the judicious use of information. They are also intensive, rely heavily on information systems and the results of their efforts are either read, heard or recorded for future access.

Haphazard process

In good times, little thought is given to the fact that useless information may be created or vital information may be missing. As long as profits and/or return on investment goals are met, the information investment remains latent. In times of economic stress, companies reduce payroll costs in order to protect the viability of the enterprise. No correlation has been made between the value of information and payroll expense. Therefore, the process of weeding out nonvital costs is haphazard at best. The conscientious valuation of information is a necessary practice in both good times and bad. The process of studying the relationship of the information investment to the amount expensed annually for information systems is the first step based on the following methodology:

Step 1. Goals and objectives. The beginning points of valuing information for an enterprise are the goals and objectives of the business. These goals include obtaining greater market share, increasing revenue and profit (and, ultimately, return on investment) and expanding into new markets and ventures.

Most enterprises have goals and objectives that have been set at the highest executive level. Coupled with these goals and objectives is a handful of business areas that must have positive results in order to achieve the goals and objectives.

IN DEPTH/BOTTOM LINE

Because the goals deal with the future growth of revenue, profit and return on investment (future cash flow), the investment made to achieve positive results for those business areas may be classified as a deferred expense or asset. The investment made in information and information systems plays a vital role in achieving positive results.

Let's take a look at an example of the process involved with establishing those areas needing positive results (critical success factors) to achieve a goal of doubling revenue and profits every five years. Business areas for a bank might:

■ Offer the most complete line of financial services and conveniences for multinational corporations and consumers.

■ Implement simplified loan processes to encourage more use of this bank.

■ Give personalized and custom service to make customers feel that they are not being treated as numbers.

■ Make sound financial investments to optimize return on investment.

■ Maintain cost-effective operations so that rates for services may be highly competitive.

Step 2. Determine what information is necessary. The next step is to ascertain what information is necessary to achieve positive results of the critical success factors. Continuing the above example, the investment in the information asset for the banking business that would be needed would require the following steps:

■ Create a complete information base on multinational firms, the locations of every part of their operations and affiliates, financial and tax status and probable needs and the names, titles and some personal information about all key executives and contacts. Include complete records on which competitor is now meeting those needs and the history of any problems or stress in any of those relationships. Create complete subject information bases on all current and prospective multinational bank consumers: their habits and preferences, their behavioral financial history and their demography.

■ Automate the loan process so that loan officers need not have the applicant fill out a financial statement. (There is already sufficient data to determine credit worthiness: Provide the customer with a simple process to create loans (Visa or Mastercard) and provide loans through fraternal and civic organizations.

■ Create a subject information base to ascertain which banking services are used and preferred by each individual bank customer. Include any past problems, solutions and open items to ensure that all customers can call in at any time, and the necessary information will be available to a bank employee contacted by a customer. The bank employee will have access to the appropriate history of the customer and can treat that customer as an "old friend" of the bank.

■ Maintain complete subject information bases on all forms of financial investment, their historical behavior and complete analyses of economic and business events as to their impact on any present or possible future investment. Create the capability to advise bank customers who have vested interests in any

particular investment as to past, current and future prospects of the quality of the investment.

■ Eliminate any information bases that are not required by law or necessary to achieve positive critical success factors. Consolidate all bank planning activities for the planning of the business, the information asset and the planning of information technology. Integrate these as a single cohesive effort.

This process bears a strong relationship to the Business Systems Planning methodology promoted by IBM. This was a critical success factor in establishing the information resource plan at the World Bank — a leader in implementing this methodology in a pragmatic manner. It is also significant that the World Bank has a chief information officer, Mel Ray.

Step 3. Creating the information bases. The investment to create the above information bases will be substantial. In all likelihood this information will be created not as a corporate information investment, but as a splintered effort of various data bases "owned" by the various banking departments, with provincial guidelines on who has access to the data. A preferable strategy would be to recognize this investment as a corporate investment with segmented custodianship by the operating groups who use and maintain a particular information base. This process has recently been overcome at the Wells Fargo Bank by its chief information officer, Jack Hancock.

The valuation process, the useful life of the asset and the future costs of maintenance should be planned at the time of the decision to create the

information base. The basis for estimating the amount of the investment to be made would include all labor and information technology costs (data collection methods; hardware, software and communications systems acquired; and application systems created).

This investment is being made to create future net cash flow. It is for the exclusive use of the bank. Great lengths will be taken to ensure the security of the information, and the bank will finance the investment out of its own internal funds. The bank has created what in future years might be considered a capitalizable asset — and it deserves to be treated as such.

The investors in the bank deserve to know the amount invested in these kinds of projects. Likewise, the information systems planners need

IN DEPTH/BOTTOM LINE

The investors in the bank deserve to know the amount invested in these kinds of projects. Likewise, the information systems planners need to be integrally involved in this process.

to be integrally involved in this process: It will be the information systems that will make it all possible. Most leading-edge banks have high-technology groups to assess how new information systems technology can be used to serve a strategic need.

At present, the information and information system investments are simply buried in "operating expense," with a resultant reduction in current earnings. Because of this kind of accounting, unenlightened banks, in attempting to maximize

profit or return on investment, will not undertake the full and complete program necessary to survive in the long run. Rather, they will force information systems to patch older, less efficient and incomplete information-handling processes. The end result will be reduced future revenues, reduced profits, low returns on equity and, quite likely, a new bank president or merger.

The basis for valuation of the information investment and the attendant information system investment

should be conducted just as any other "construction" project such as the completion of a building. The accounting principles for construction are standard project accounting principles: The value of the building is established as the total cost of the project, including material, labor and overhead. The building's ultimate value will be determined by the rents produced.

Bank of America

This same process is being used by the Bank of America in restructuring the way that it handles interactive processing with its customers. Executive Vice-President Max Hopper is using information technology to gain a competitive advantage by providing additional revenue-generating services (including the bank's use of the Airline Control Program that he

successfully used at American Airlines).

The valuation of the information base as an asset may be valid, but it also contains risk — the risk contained in valuing any asset. The foundation of the building might be inadequate, and the government authorities might rate the building uninhabitable. An inventory of precious metals may be written down in a future period because the market price has fallen drastically, or an electronic component carried at some high value in inventory might be rendered obsolete in the next year.

An investment in information might not achieve the desired effect on critical success factors. However, it is the job of management (later audited by the DP auditors and financial auditors) to determine the risk associated in making any significant investment.

Ultimately, the financial community will agree that if an information investment affects a critical success factor, then it merits valuation as a true corporate asset.

An easy step for the accounting of information would be to measure expenditures on information as research and development expenses. This would result in an initial step of a new expense category on the profit and loss statement: information. This is the way information investments were treated in the survey conducted for this article.

For those not wishing to modify their profit and loss statements, at least a footnote to the financial statements is in order. With the recognition of an information "expense" including all the above components (labor, overhead and technology), the auditing staff can determine the effectiveness of this new expense category and whether the value added by information systems is being optimized. Validating the effectiveness of this expense will lead to the question of how to benefit future cash flows (revenue) by optimizing the investment in information and realizing its value with sufficient information systems.

The auditors must also search for the answer to another vital question: which critical success factors are *not* supported by an investment in information. Perhaps the lack of an appropriate information base constitutes a real concern for top management. Can you imagine a scenario where critical information was neither created, maintained nor available because the information systems group (often reporting to the chief financial officer) was an undesirable expense that should be heavily controlled so that it doesn't get out of hand?

The Institute for Information Management will continue this research and has developed a program to assist management and corporate analysts in understanding the interaction of the information and information system investment and organizational productivity.

About the author

David R. Vincent is general manager of the Institute for Information Management. He is vice-president of Boole & Babbage, Inc. Vincent has more than 20 years of financial, accounting and information management experience and has managed firms in 15 countries. He is currently writing a book on information economics.

SYSTEMS & PERIPHERALS

Look-alikes: Only the unique survive

There is an interesting dichotomy that results from the ready availability of off-the-shelf components like semiconductors and microprocessors.

On one hand, the fact that virtually anyone can purchase the components necessary to build a computer system gives small entrepreneurial companies a rare chance to break into the highly profitable high-tech marketplace. On the other hand, easy access to so-called standard components makes it incredibly easy for start-up firms to produce look-alike versions of successful products.

Perhaps the classic example of the latter case is the microcomputer industry. Based on the early success of companies like Apple Computer, Inc., many companies (both big and small) decided to jump on the microcomputer bandwagon. IBM, for example, created the highly successful Personal Computer line from components purchased from other vendors. And as everyone knows, the result was a flood of smaller companies making IBM look-alike microcomputers. It got to the point where there were well over 100 companies making microcomputers. That was until the washout started. Now, microcomputer companies appear to be dropping like flies.

Graphics workstation mart

The same thing appears to be happening in the graphics workstation market. In the past six months, *Computerworld* has published, on the average, three new graphics workstation product announcements each week. Each of the companies that has unveiled graphics workstations is convinced it has hit upon *the* approach to graphics. Many of their stories sound suspiciously alike, however.

Undoubtedly, some vendors of graphics workstations will be highly successful because they really do have a unique, innovative approach to computer graphics used in applications like computer-aided design and manufacturing and printed-circuit design.

Others, however, unfortunately are doomed to drop by the wayside, mainly because they are offering look-alike or "me-too" products.

From the business aspect, the fact that some companies succeed and others fail is a fact of life. Entrepreneurship, while it offers the potential for phenominal success, also carries the threat of abject failure.

From the user's standpoint, the flood of very similar products can be abysmally confusing. Not to mention the threat that many smaller companies may wind up going out of business, possibly leaving the owners of their products out in the cold.

Like the microcomputer business, there will be a washout in the graphics workstation market. The victims will most likely be the companies that have failed to take an innovative approach to designing a graphics workstation.

MDS Quantel offers top-end addition to supermini family

By Tom Henkel
CW Staff

HAYWARD, Calif. — MDS Quantel, Inc. has unveiled a top-end addition to its line of superminicomputers called the System 264. The system consists of a 16-bit CPU plus a 64-bit memory interface that is said to handle instruction fetching and encoding.

The system is said to offer twice the internal throughput of the firm's base System 64, which was announced in 1982. A spokesman said the speed increase is largely a result of newer circuit technology used in the System 264. The System 64, however, is still being marketed, the spokesman said.

Claiming the System 264 offers internal performance of roughly 1.5 million instructions per second, the vendor said the System 264 offers a maximum main memory capacity of 16M bytes and a disk storage capacity of 1.4G bytes. The System 264 features a CPU cycle time of 100 nsec and a memory cycle time of 200 nsec. It can support up to 16 I/O control units, the vendor said.

All current Quantel systems are field-upgradable to the System 264, the vendor said. A spokesman said the least extensive upgrade, a series of board changes to convert the System 64 into the System 264, costs approximately $30,000.

The System 264 is said to be compatible with Quantel's Best operating system and
See **MDS** page 90

Four-Phase supermini add-ons debut

CUPERTINO, Calif. — Four-Phase Systems, Inc., a subsidiary of Motorola, Inc., has announced enhancements to its 2000 family of communicating desktop superminicomputers.

The enhancements include the addition of a Motorola 68010 microprocessor, a virtual memory version of AT&T's Unix System V operating system, a 52M-byte Winchester disk drive said to increase on-line storage to 369M bytes and a 5M-byte removable Winchester disk, the company said.

The 2000 series is said to feature IBM-compatible batch and interactive communications using IBM's Systems Network Architecture and Binary Synchronous Communications and asynchronous protocols.

The enhancements are available for the Model 240 and Model 260. In addition, a microprocessor is packaged with a 5M-byte removable media disk drive and a 15M-byte fixed media disk drive on the Models 240/3 and 260/3, the company
See **MINI** page 86

Envoy turnkey links micros, superminis

FRAMINGHAM, Mass. — Envoy Systems Corp. recently announced a turnkey system that integrates portable microcomputers and Digital Equipment Corp. VAX-11 series superminicomputers. The system was designed for use by sales personnel for medium- to large-size field sales organizations.

Called the Salesmate system, the unit uses 16-bit portable microcomputer workstations with a modular family of sales application software that can be linked to a home office VAX-11 system via autodial modems using telephone lines.

The microcomputer is from Gavilan Computer Corp., and the sales application software was developed by Envoy. Communications are via Envoy's full-duplex protocol, and the central office minicomputer can be a VAX-11/730, VAX-11/750 or VAX-11/780. Branch offices can be
See **ENVOY** page 91

Controller enhancements tout performance

LOUISVILLE, Colo. — Storage Technology Corp. recently announced three enhancements for its intelligent disk controller, the 8890 Sybercache.

Said to improve the performance of the data storage subsystem it controls, the Sybercache now offers up to 18M bytes of cache memory, an eight-channel switch and a special dual-frame configuration said to combine two 8890 units.

The 18M-byte memory, a field-installable option to be available in December, is said to support the expanded cache needs for the firm's 8380 disk drives and the company's 8350, 8360 and 8650 drives. Previously, memory in the 8890 Sybercache could be either 1.5M, 3M, 6M or 12M bytes, the company said.

The eight-channel switch, which allows eight channels to be connected to the Sybercache, is said to permit the disk subsystem to be shared by multiple processors. The switch will be available in December, the company said.

With the dual-frame option, two Sybercache units can be interconnected. If there is a power interruption, the second controller is said to provide an alternate path to attached disks, the company said.

The dual-frame option is available to users of existing 8890 units and can be added as an upgrade at the user's site, the company said.

The 8890 Sybercache intelligent disk controller is said to improve I/O response time by as much as 75%, depending on the application, the company said. The improvement is accomplished by prestaging data in a solid-state memory, allowing computer access at electronic speed, the company said. Sybercache is said to be compatible with the IBM 4300, 370/135-168, 30 series or equivalent CPUs, the company said.

The 8890 also supports all IBM MVS, VM and DOS/VSE operating systems and was intended for use with Storage Technology's 8350, 8650, 8360 and 8380 disk drives, the company said.

More information is available from Storage Technology, 2270 S. 88th St., Louisville, Colo. 80028.

Symbolics offers 32-bit CPU-based graphics system

LOS ANGELES — Symbolics, Inc. has introduced a modular color graphics system based on the Symbolics' 3670 32-bit CPU. Using software developed by Lisp Machine, Inc., the unit is said to provide image generation and processing capabilities. The firm also announced optional graphics software packages for the system.

Available in September, the system is targeted to graphics production users such as broadcasters, post-production and special effects houses. The system's applications are said to encompass industrial and educational areas including comput-er-aided design and manufacturing, architectural design, training and graphics research.

The color frame buffer is said to offer programmable resolution ranging from 640 by 480 pixels to 1,280 by 1,024 pixels. The color frame buffer is also said to offer two million pixels worth of memory, hardware pan and hardware zoom.

The Symbolics color graphics system offers a choice of either 256 pseudocolors of eight bit/pixel or direct color of 24 bit/pixel. A palette of more than 16 million colors is available.

The software options include: S-Paint digital canvas; S-Geometry three-dimensional data base, editor and displayer; S-Render three-dimensional rendering; S-Dynamics motion and frame recording control; and standard Symbolics packages, such as Fortran and the Macsyma symbolic mathematics system.

The system contains on-line hard disk frame and program storage and off-line archiving on ¼-in. cartridge or industry standard ½-in. tape or removable media disk, the company said. Nonremovable Winchester disks come in 167M-byte and 474M-byte sizes, and a 300M-byte removable disk is available.

The basic system configuration includes the Symbolics' 3670 CPU with 4M bytes of main memory, the High-Resolution Pseudo-Color Frame Buffer, a high-resolution black-and-white bit-mapped console, a digitizing graphics tablet, a 167M-byte Winchester disk and a cartridge tape drive.

The basic system costs $130,000 in single quantities.

Symbolics is located at 1401 Westwood Blvd., West Los Angeles, Calif. 90024.

Seiko unveils desktop graphics terminal, 2414 enhancements
Targeted toward scientific and engineering markets

MILPITAS, Calif. — Seiko Instruments U.S.A., Inc. has announced a desktop version of its D-Scan GR-2414 graphics terminal, called the GR-2424, and also a parallel interface and 16-million-color palette enhancement for the 2414.

Targeted to scientific and engineering markets, the 2424 is said to have a resolution of 1,280 by 1,024 pixels at a 60Hz refresh rate and 1,024 colors from the expanded optional color palette of 16.8 million, the vendor said.

Based on Zilog, Inc.'s 8-bit Z80 and 16-bit Z8002 microprocessors, the 2424 is said to feature the ability to expand to 10-bit planes. Display list memory is 1M byte, and the unit includes an RS-232 interface, the vendor said.

The GR-2424 costs $16,950 and is available 90 days after receipt of order, the vendor said.

The company's enhanced GR-2414 terminal features a 16-bit parallel interface that is said to ensure compatibility with the Digital Equipment Corp. VAX-11 family of superminicomputers.

Two logical devices can be used simultaneously on the 2414 via the RS-232 ports. The unit's terminals editor operates at 19.2K bit/sec while concurrently downloading images from the host through the parallel interface.
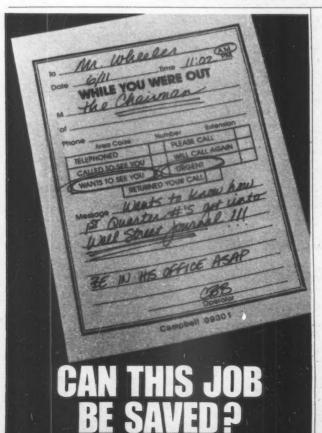
The enhanced color palette expands the 2414's standard 5-bit digital-to-analog converter (DAC) to an 8-bit DAC, extending the color palette to 16.8 million with up to 1,024 active colors, the company said.

Applications such as solids modeling and photographic-type imaging are supported by the extended palette, the company said.

The parallel interface option is priced at $3,000, factory installed, and the GR-2414 is priced at $15,950 in single quantities, the vendor said. It is also said to be available 90 days after receipt of order.
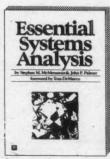
More information is available from Seiko at 1623 Buckeye Drive, Milpitas, Calif. 95035.

WE'RE BUILDING ON OUR GREAT REPUTATION.

Introducing the T300, a line printer with the reliability we're famous for, plus the flexibility you need...all at an attractive low price. Coming up with a better printer than our existing model 40 was no easy task. Especially when you consider its reputation for outstanding reliability.

So in designing the T300, Teletype Corporation's primary goal was to add more features without sacrificing reliability. What we've come up with is one of the most flexible printers available. One that offers a great value and should even surpass the reliability of our model 40.

You see, we've added a microprocessor-based controller for increased capability. We also replaced complex mechanical assemblies with MOS/LSI circuitry that adds to reliability. The result: the T300 withstands the abuse of our rigorous testing that includes printing 500,000 full lines over a 16 hour period.

On top of greater reliability, the T300 is also easier to use. Instead of flipping DIP switches, the operator conveniently enters options from a keypad. A 4-digit LCD display verifies entered options and provides printer status information.

We've also given the T300 an appealing type font. You can choose popular fonts including "Prestige Elite." There's even a new stylized tabletop cabinet that helps minimize noise.

The T300 is available with an RS232C interface, operates at up to 9600 bps, and prints up to 300 lines per minute. The serial interface has a 2000 character buffer which helps handle a heavy burst of data. The T300 is also available with a Centronics parallel interface. The printer adapts to many OEM applications and is compatible with popular mini-computers.

Another T300 plus is that it handles virtually any business form, from small labels to wide format computer reports. It also features electronic VFU. You can program and store up to five different formats that can be down-line loaded, or invoked locally.

Self diagnostics on the T300 help prevent unnecessary service calls. But in the unlikely event it needs repairs, you can count on our established nationwide service organization.

We admit it was a tough act to follow, but we'd bet our reputation on the T300. For more information, write Teletype Corporation, 5555 Touhy Ave., Dept. 3223-F, Skokie, IL 60077. Or call 1 800 323-1229, ext. 305.

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AT&T
Teletype Corporation

SYSTEMS & PERIPHERALS

TERMINALS

TELEX COMPUTER PRODUCTS, INC.
1186 Intelligent Workstation

Telex Computer Products, Inc. has unveiled the 1186 Intelligent Workstation, which the vendor said allows users of 3270 terminals to use most software developed for the IBM Personal Computer.

The 1186 can operate as a stand-alone local processor, using Microsoft Corp.'s MS-DOS operating system, or as an on-line 3270 display station for host interaction. Its optional coaxial feature board enables users to support 3270 host access for applications requiring on-line capabilities.

The 1186 uses an Intel Corp. 80186 microprocessor. It is offered with either two dual-sided, double-density floppy disk drives, each with 360K bytes of formatted capacity, or a 10M-byte hard disk drive with a single floppy disk drive.

Memory capacity for the 1186 ranges from 128K bytes of random-access memory (RAM) and 32K bytes of read-only memory to an extended capacity of up to 512K bytes of RAM.

The 1186, which supports a monochrome display, also supports a color monitor without the addition of a feature board.

The 12-in., nonglare display features tilt-screen capability and is available in either green or amber phosphor. Standard features include two serial ports and one parallel port.

The 1186 is priced at $3,025 for the model with two floppy disk drives, 128K bytes of RAM and an MS-DOS operating system. The 1186 model with a hard disk drive, 256K bytes of RAM and MS-DOS is priced at $4,980.

Telex Computer Products, 6422 E. 41st St., Tulsa, Okla., 74135.

TANDY CORP.
DT-100

Tandy Corp. has introduced the DT-100, an Ansi 3.64-compatible display terminal, and a 9,600 bit/sec serial-to-parallel converter.

The DT-100 is said to offer ergonomic design and software compatibility with Digital Equipment Corp. VT100 terminals. It also reportedly features a built-in serial printer port with programmable transmission rates, a 14-in. screen character set and a keyboard with DEC VT220-compatible editing keys and 16 programmable function keys.

Also reportedly included in the DT-100 is the full 128 Ascii character set and support for 80- or 132-col. by 24-row displays. The power-up parameters for the DT-100 can be changed by the operator and stored in nonvolatile memory.

The DT-100 is priced at $795, and the 9,600 bit/sec serial-to-parallel converter is priced at $99 and is expected to be available by Sept. 15.

Tandy, 1800 One Tandy Center, Fort Worth, Texas 76102.

LEE DATA CORP.
Model 408

Lee Data Corp. has announced the Model 408 controller in its Series 400 controller line, said to be designed for offices requiring up to eight lines to Digital Equipment Corp. or Hewlett-Packard Co. CPUs in addition to standard IBM 3270 terminal communications.

The eight asynchronous lines feature performance levels from 1,200 to 9,600 bit/sec per line, the company said. In the 3270 mode, the Model 408 is said to support up to 16 display stations and use either binary synchronous or IBM's Systems Network Architecture or Synchronous Data Link Control communications standards with speeds from 1,200 to 9,600 bit/sec.

The Model 408 is said to support all Lee Data's display terminals. The 408 costs $8,075 in single quantities and is available now, the vendor said.

Lee Data, 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

DELTA DATA SYSTEMS CORP.
Model D2830-III

Delta Data Systems Corp. has announced the Model D2830-III Burroughs Corp.-compatible terminal, featuring a detachable 96-key keyboard said to be capable of storing up to 300 keystrokes in nonvolatile storage.

The Model 2830-III is said to offer dual host communications for selection of Burroughs' protocol or a second mainframe, the company

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said. The terminals can be expanded to include local and remote printing and other personal computer applications by the addition of other Delta Data components, the company said.

The Model D2830-III costs $1,495 in single quantities, the vendor said.

Delta Data Systems, 2595 Metropolitan Drive, Trevose, Pa. 19047.

DELTA DATA SYSTEMS CORP.
Delta Data 8303

Delta Data Systems Corp. has announced the Delta Data 8303 intelligent editing terminal, based on the Texas Instruments, Inc. 99000 16-bit microprocessor and aimed at the text publishing market.

The 8303 features a tilt-and-swivel monitor and a 127-key detachable keyboard that the user can operate from a desktop or lap position, the company said.

Character screen format on a 14-in. screen is 28 lines by 80 char., the company said.

The 8303's text processing software is said to offer editing tasks and multitask windowing ability, with up to eight screen segments available. The 8303 also features large document control with 40K bytes of scrolling memory.

The 8303 is available with a range of options, including local disk storage with dual 5¼-in. disk drives, the company said. An RS-232 interface is used.

The 8303 is priced at $2,395 in single quantities, the vendor said.

Delta Data Systems, 2595 Metropolitan Drive, Trevose, Pa. 19047.

SABER TECHNOLOGY CORP.
Saberlink

Saber Technology Corp. has introduced a local communications link that allows users of IBM mainframes to use Saber workstations.

Saberlink is a microprocessor-based cluster controller that attaches directly to the mainframe channel. According to a company spokesman, the controller supports up to eight Saber workstations and provides interactive as well as file-transfer modes. It was designed to provide access to design analysis software resident on IBM and IBM-compatible mainframes.

The Saberlink can operate at up to 2M byte/sec. Each workstation has a 3.5M bit/sec coaxial link to the cluster controller.

The Saberlink will be available in the first quarter of the year, with prices ranging from $29,950 for a four-port system to $32,500 for an eight-port system.

Saber Technology, 2381 Bering Drive, San Jose, Calif. 95131.

PRINTERS/PLOTTERS

QUALITY MICRO SYSTEMS, INC.
QMS Smart Writer

Quality Micro Systems, Inc. has announced the QMS Smart Writer laser printer, based on the Motorola, Inc. 68000 microprocessor and said to offer 90,000 dot/sq in. resolution.

The product is said to simulate Qume Corp., Diablo Systems, Inc. and Epson America, Inc. printers and features four standard fonts. It also offers 64K bytes of memory for programming features; text and graphics intermixing on one page; multiple overlays for forms storage; reverse image; two-character orientations; line and box drawing; plot/pixel mode for bit-mapping logos, signatures and other images; single command for page orientation; and absolute and relative vertical/horizontal positioning.

Centronics Data Computer Corp. parallel interface is standard; RS-232 interface is optional, the company said.

Intended for a work cycle of up to 3,000 page/mo, the QMS Smart Writer is said to print up to eight page/min. Letter- and legal-size, 17- to 21-lb stock can be cassette-loaded, the company said. Manual feed capability includes envelopes, postcards, transparencies and duplex copies in 16- to 34-lb stock.

The QMS Smart Writer is priced at $4,495 and is scheduled for November delivery, the company said.

Quality Micro Systems, P.O. Box 81250, Mobile, Ala. 36689.

FUJITSU AMERICA, INC.
DPMG9

Fujitsu America, Inc. has announced the DPMG9 nine-wire, dot matrix, bidirectional, 80-col. printer, said to print at 180 char./sec in draft quality.

Friction and tractor feeds are standard features, as well as automatic perforation/skip, the company said. Other features include fine-image print pitches, a 255-char. font that is downloadable and a language selection function. The DPMG9 is said to be capable of printing international characters, superscripts, subscripts and images. The DPMG9 weighs 19 pounds and measures 12 in. by 16 in. by 4 in., the company said.

Production of the product is scheduled to begin in November, the company said. It will be distributed through Computers International, Inc. to retail stores as the Daisywriter Matrix 9 and will be sold in two configurations: an IBM-compatible version and an Epson America, Inc. FX80-compatible version. A Centronics Data Computer Corp. interface is standard with the DPMG9, and an RS-232C interface is optional.

Both configurations will have a list price of $695, the company said.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

FACIT, INC.
4528

Facit, Inc. has announced the 4528 demand document printer, reportedly capable of printing matrix characters at 165 char./sec, or 285 char./sec at 17 char./in., with a design that allows users to tear off documents within a ½ in. of the last printed line, said to be useful for ticketing and custom label applications.

The 4528 is available in three versions: the 4528 demand document version for ticketing and labeling, the

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4528T for standard text-printing applications and the 4528V for bar code and label printing.

RS-232 and Centronics Data Computer Corp. interfaces are standard, the company said.

The 4528 is priced at $1,775 in single quantities, the vendor said.

Facit, 235 Main Dunstable Road, Nashua, N.Y. 03061.

VERSATEC, INC.
Models 7222, 7422, 7224, 7424 plotters

Versatec, Inc., a Xerox Corp. company, has added four models to its 7000 family of plotters.

Models 7222 and 7422 plot on 22-in.-wide media, and Models 7224 and 7424 plot on 24-in.-wide media, the company said. Models in the 7200 series plot at 200 point/in., and models in the 7400 series plot at 400 point/in., the company said.

An adjustable plot speed control permits the operator or host processor to set the speed from .125 in./sec to a rated speed of 1.5 in./sec (7200 series), enabling 24-in. models to plot up to 15 sq ft/min, the company said.

Maximum accumulated error of a plot is ±.15%, horizontal and vertical.

The models use standard voltages and demand less power, said to be reduced from 1,600W to 600W.

The 7000 series plotters are intended to meet meantime between failure of 4,000 power-on hours.

The Model 7222 and 7224 cost $26,200; and the Model 7422 and 7424 cost $35,900, the vendor said. Shipments of the plotters are scheduled for November.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

TEMPEST
TECHNOLOGIES, INC.
DWP5155

Tempest Technologies, Inc. has announced the DWP5155 daisywheel printer, said to have an RS-232 interface and printing speed of 45 char./sec.

The printer is said to accept printwheels of 10, 12, 15 pitch and over 100 font styles.

The DWP5155 costs $5,800.

Tempest Technologies, 1776 Old Meadow Road, McLean, Va. 22102

CALIFORNIA COMPUTER PRODUCTS, INC.
5700 series

California Computer Products, Inc. has announced the 5700 series of four electrostatic plotter/printers, said to operate with media widths up to 36 in., speeds of up to 2 in./sec and resolution of up to 400 dot/in.

The series targets inte-

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said. Models 240/4 and 260/4 include a microprocessor with a 5M-byte removable media disk drive and a 52M-byte fixed media disk drive, the company said.

The 2000 series uses an Ansi X3T9.3 Small Computer Systems Interface disk bus to attach up to four disk subsystems and up to eight disk drives, for a maximum of 369M bytes of on-line Winchester disk storage with intelligent disk controllers, the company said.

Microprocessor support

The Model 240 uses a Motorola 6809E 8/16-bit microprocessor with a memory mapping unit, multichannel direct-memory access controller and time-of-day clock with battery backup.

The Model 260 is based on a Motorola 68010 microprocessor with 32-bit instructions, 24-bit address bus, 6-bit data bus, virtual memory and demand paging support, according to the company.

Up to 12 serial interfaces can be included to support host communications workstations and printers, the company said.

With a modem, the company said a 2000 series workstation and attached printer can be placed remotely from the processor. Virtual memory and demand paging have been added to the 2000's version of Unix System V, the company said.

A 2000 series Model 240/3 with one workstation, 384K bytes of memory and 20M bytes of Winchester disk storage lists for $8,710, the company said.

A Model 260/4 with four workstations, a Motorola 68010 microprocessor, 512K bytes of error-correcting memory, a master I/O controller and 57M bytes of Winchester disk storage costs $20,550, according to the vendor.

More information is available from Four-Phase, which is located at 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

SYSTEMS & PERIPHERALS

grated circuit board design, printed-circuit board design, geophysical mapping, mechanical design and architectural, engineering and construction applications, the company said.

Features include line enhancement, a firmware character generator and self-diagnostics, in addition to Calcomp's Enviroclean toning system, the vendor said. Users can select from 24-in. or 36-in. media widths and 200 or 400 dot/in. resolution, the company said. For darker lines, a line enhancement feature is said to provide three selections of increased line weight.

The firmware character generator is said to allow use of the 5700 series as a line printer with speeds up to 960 line/min. Built-in self-diagnostics run tests each time the plotter is turned on, and an LED and 32-char. display notify the user if attention is needed, the company said.

The 5700 series, available for shipping in September, is software- and controller-compatible with most current systems, including those from Calcomp, Versatec, Inc. and Benson, Inc., the vendor said.

In single-unit quantities, the Model 5732 with 24-in. media width and 200 dot/in. resolution costs $24,995; the Model 5734 with 24-in. media width and 400 dot/in. resolution costs $29,995; the Model 5742 with 36-in. media width and 200 dot/in. resolution costs $34,995; and the Model 5744 with 36-in. media width and 400 dot/in. costs $39,995.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

CALIFORNIA COMPUTER PRODUCTS, INC.
1040 series

California Computer Products, Inc. (Calcomp) has unveiled the 1040 series of cut-sheet and dual-mode pen plotters, said to accommodate eight pens and width plotting capability up to Ansi Size E or International Standards Organization Size AO.

Aimed at the computer-aided design market, the 1040 series includes two plotters, Models 1042 and 1043. Model 1043 performs in cut-sheet plotting only, and Model 1042 is a dual-mode plotter that operates in both cut-sheet and roll-feed modes, the company said. With a dual-mode plotter, a user is said to be able to produce single plots and batch jobs in production environments.

Features include an eight-pen turret with automatic pen capping, an integrated communications interface, nonvolatile setup memory, automatic logon messages and self-test diagnostics, the company said. The pen turret is said to eliminate delays in throughput caused by side-to-side returns for pen exchanges, and it is said to allow up to eight colors and/or pen types to be mixed.

Plotter compatibility with a variety of computer-aided design systems is offered, including Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M-based systems, the company said. Model 1043 has a plotting speed of 6 in./sec, and Model 1043 has a plotting speed of 14 in./sec; the plotters offer RS-232, RS-449 and IEEE-488 interfaces, according to

the vendor

The Model 1043 will be available for shipping in October, and the Model 1042 will be available in November, the company said. The single-unit price for both models will be $8,495, the vendor said.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

GRAPHICS SYSTEMS

CALMA CO.
Tegastation

Calma Co. has enhanced its Tegastation, an integrated computer-aided engineering workstation used to design, simulate, test and analyze integrated circuits and printed-circuit board designs.

Enhancements include two optional packages for testing digital circuit designs, networking capabilities and enhancements to the workstation's core software programs, according to Calma.

The system, based on Apollo Computer, Inc.'s Domain superminicomputer, includes an integrated set of schematic capture, simulation, test and analysis tools, according to the vendor.

Tegastation is said to perform testability analysis, fault generation, automatic test pattern generation and fault simulation.

Prices for the system begin at $50,000.

Calma, 2901 Tasman Drive, Santa Clara, Calif. 95050.

CALMA CO.
T-Array

Calma Co. has announced T-Array, an integrated color graphics system for automatic placement and routing of single- or double-level Cmos gate arrays.

The package provides an automatic hierarchical macro placer and router, interactive macro placement and routing editors, a netlist-to-layout checker, a design rule checker and post-layout delay analysis, Calma said.

T-Array can place macros automatically, or the designer, using hierarchical boundaries established during schematic capture and simulation, can position them interactively, Calma said.

The product runs on Digital Equipment Corp.'s VAX series minicomputers and on Tektronix, Inc. 4000 graphics terminals.

T-Array costs $120,000.

Calma, 2901 Tasman Drive, Santa Clara, Calif. 95050.

DATACOPY CORP.
Model 900

Datacopy Corp. has announced the Model 900 integrated imaging system, which combines the company's Model 610F Electronic Digitizing Camera (EDC) technology with its Word Image Processing System (Wips) software for use in making the IBM Personal Computer XT into an image processing workstation.

The EDC provides four scanning

SYSTEMS & PERIPHERALS

modes, 1,728 by 2,846 8-bit pixel resolution, programmable scan times and windows. The focus and framing capability is activited by the host computer or from an optional hand controller, the company said.

The Wips software includes applications software that can interface to most IBM Personal Computer word processing, integrated information management systems and data base management software packages.

The Model 900 package includes the Model 610F EDC and Wips software, the Model 110 image processing interface board for the IBM Personal Computer, Model 30A professional camera stand with optimized illumination, Model 40 lens set, Model 20A EDC power supply and interface cabling, the vendor said. The Model 900 integrated imaging system costs $10,945 and will be available in October, the vendor said.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

DICOMED CORP.
D38C system

Dicomed Corp. has announced the D38C computer graphics design system, an enhancement of the Dicomed D38+ design station said to combine the capabilities of the D38+ with a 2,000- to 4,000-line resolution 35mm recording camera.

Aimed at the computer-generated presentation graphics market, the D38C

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can use Quantel's Best/Net local-area network.

A basic configuration of the System 264 includes a transaction processor, 1M byte of main memory, a real-time clock, terminal controller, communications controller and 26 I/O interface slots. The configuration costs $105,000, the vendor said.

A 2M-byte configuration, including 800M bytes of disk storage, a 1,000 line/min printer, a ½-in. streaming tape drive for backup, 12 CRT workstations and four matrix printers, costs $270,000, the vendor said.

MDS Quantel is located at 4142 Point Eden Way, Hayward, Calif. 94545.

combines a design workstation with a self-contained camera recording unit. The system is said to offer a range of color graphics for slide productions.

Features include 64 colors and free-form digitizing, the company said. Two type fonts, Helvetica Medium and Century Schoolbook, are included in the basic system; 20 additional fonts are optional, including a Greek Pi font for technical and medical visuals, according to the company.

Other features include 360-degree rotation, figure-to-figure interpolation, mirror imaging, Dicomed's Image Library of computer clip art and Dicomed features like Flexigon and Flexiline figure types for automatic smooth curves, the company said.

The D38C can serve as the designer's access to Dicomed's D148 series of film recorders, which can record images at 4,000- to 8,000-line resolution in a variety of film formats. Images created on the D38C can be transmitted to a D148 series film recorder, located either in-house or at a Dicomed service bureau, the company said.

The system can develop in a variety of formats, including slides, 8-in. by 10-in. overhead transparencies, 4-in. by 5-in. transparencies for print applications, black-and-white or color photos and cinema film, the company said.

To be available in November, the system costs $99,950, the vendor said.
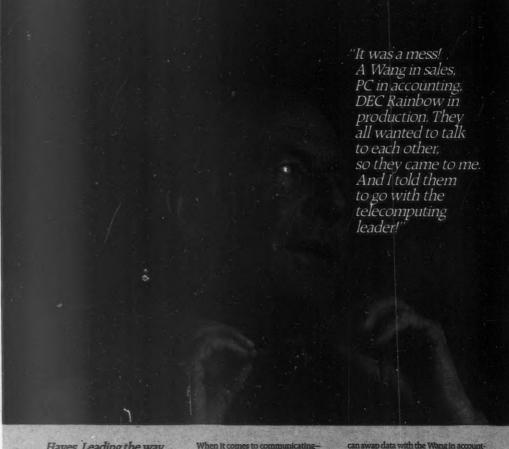
Dicomed, 9700 S. Newton Ave., Minneapolis, Minn. 55431.

TRICAD, INC.
Graphics 3

Tricad, Inc. has announced the Graphics 3 computer-aided design system for the architectural, engineering and construction industries.

SYSTEMS & PERIPHERALS

ENVOY from page 81

equipped with VAX-11/725 or VAX-11/730 CPUs, the company said. The vendor said the turnkey system could be modified to support other portable microcomputers or base computer systems.

The applications programs are written in the C language, and the operating system is Unix-based with relational data base technology.

The Gavilan micro weighs 9 pounds and can be powered by a nickel-cadmium battery for up to eight hours of usage per charge, the company said. It features a 16-line LCD screen, an integrated function key touch pad and a standard typewriter-like keyboard. The micro also features a Cmos-based memory with a capacity of up to 192K bytes, and it houses a 3½-in. floppy disk drive with 360K bytes of formatted memory.

An internal modem offers communication with any remote data base over normal telephone lines, and an RS-232 port is said to permit direct connect data transfer at a 9,600 bit/sec rate. An optional 5-lb printer is said to produce letter-quality printing at the rate of 50 char./ sec. A self-contained battery pack prints up to 60,000 characters between charges, the vendor said.

To load software in the field, sales representatives use the 3½-in microfloppy diskettes. Sales data can also be stored on the disks, and information can be forwarded from them to branch and central office CPUs. Salesmate shares a 32K-byte segment in nonvolatile Cmos memory called Magic Memory. Set aside from other processing areas, the Magic Memory is used for storing intertransaction data, workstation-control data and interdisk data, the company said.

Account summary files within Magic Memory are said to maintain summaries of clients and prospects, including such information as telephone numbers, credit limits and account forecasts. Software is 85% standard and 15% tailored to company needs, an Envoy spokesman said.

The cost of tailoring can range from $5,000 to $100,000, the spokesman said. A total of 12 software packages are planned, the company said.

A typical central office configuration includes the CPU with up to 4M bytes of main memory, from 26M bytes to 400M bytes of disk storage, two or more Digital Equipment Corp. VT240 video monitors, an on-line, letter-quality printer and communications options. The options include from four to eight telephone modems to one or two multiplexers, each capable of supporting eight to 16 phone lines, the company said.

A typical branch office system includes the CPU with up to 3M bytes of main memory, up to 56M bytes of disk storage, at least one DEC VT240 terminal and one letter-quality printer, the company said.

For sending information from the field, users can use public phone lines and Envoy's communications protocol, structured similarly to X.25 and said to feature full-duplex transmission with error checking and correction to the application level.

Purchase prices for a typical pilot program are as follows: 20 microcomputers cost $3,620 each; five software modules have a $150/mo licensing fee; a VAX-11/725 with 4M bytes of main memory, a 121M-byte disk drive, a 1,600 bit/in. tape drive and two VT102s costs $42,000; the communications package costs $5,500; and customized system consultation services cost $40,000, the company said.

The cost for the above system, for a three- to five-year lease, would be $320/mo, the vendor said.

More information is available from Envoy, 1432 Main St., Waltham, Mass. 02154.

SYSTEMS & PERIPHERALS

Based on a Digital Equipment Corp. VAX-11/730 CPU, Graphics 3 features 3M bytes of memory, a tape drive, a Hewlett-Packard Co. 7585 plotter and a black-and-white workstation. Software capabilities of the new system can be added to the more powerful Graphics 3 models using the VAX-11/750 or 11/780 CPUs, the company said.

All the systems are said to include the Tricad intelligent workstation and the Ethernet protocol.

The Graphics 3 system costs $150,000, the vendor said.

Tricad, 1655 McCarthy Blvd., Milpitas, Calif. 95035.

POWER SUPPLIES

SUPERIOR ELECTRIC CO.
Stabiline

Superior Electric Co. has announced the Stabiline uninterruptible power supply/conditioners, said to provide backup power to computers and other voltage-sensitive equipment within ±3% of nominal.

When a power disruption occurs, an audible alarm is activated, and the unit is said to provide a continuous sine wave output that will not overheat transformers or overstress other components.

The product is priced at $800 to $1,000, depending on the model, the vendor said.

Superior Electric, 383 Middle St., Bristol, Conn. 06010.

POWER GENERAL
3075 series

Power General, a subsidiary of Unitrode Corp., has announced the 3075 series of 75W, triple-output switching power supplies, said to comply with national and international safety standards.

The 3075 series offers 4,000 Vac isolation, 70% efficiency and a minimum holdup time of 32 msec, the company said. Standard features are said to include output overload protection and soft start.

The 3075 series includes three models giving output combinations of 5, 12 and 24 Vdc. The +12 Vdc and +24 Vdc outputs are said to accept pulse-load currents, making them useful in applications involving disk drives, printers or other pulse-load electromechanical devices, the company said.

All models are specified for operation over a temperature range of 0 degrees Celsius to 70 degrees Celsius, the company said. The power supplies are fabricated on a single 4-in. by 6½-in. by 2-in. printed-circuit board that weighs 1 lb.

The price for each of three models, 3075-1, 3075-2 and 3075-3, is $119, the vendor said.

Power General, P.O. Box 189, Canton, Mass. 02021.

CLARY CORP.
UPSjr

Clary Corp. has announced the UPSjr uninterruptible power system, intended for use with supermicro-computers. The unit comes in three models: 750VA, 1.25 kVA and 2.5 kVA.

The UPSjr is said to be one-third the size of standard UPS units and can reportedly operate at a noise level of 55 dba, the company said.

The price for the 750VA model is $3,400, and the price for the 2.5-kVA model is $6,400, the vendor said.

Clary, 320 W. Clary Ave., San Gabriel, Calif. 91776.

ONEAC CORP.
FT4115

Oneac Corp. has announced the FT4115 480V-in/120V-out power conditioner for factory automation and electronic component applications.

The 1.5-kVA product operates at both 50Hz and 60Hz. At 50Hz, the product can be field-configured for 380V, 400V and 450V inputs; at 60Hz, it can be configured for 440V, 460V and 480V inputs, the company said.

Electrical noise as severe as IEEE 587-1980, Part A (6,000V) is reduced to under 10V normal-mode and ½V common-mode, the vendor said.

The FT4115 costs $1,002 in single quantities, the vendor said.

Oneac, 2207 Lakeside Drive, Bannockburn, Ill. 60015.

CALIFORNIA DC
Model LR1029

California DC has announced the Model LR1029 add-on, disk drive switching power supply, said to be rated at 5V at 3A for controller logic circuits and 12V at 1.5/2.5A for spindle-drive and head motors.

Designed on a 3½-in. by 5½-in. circuit card, the unit has been tested on a variety of full-height and half-height floppy and hard disk drives, streaming tape units and removable-media systems, the company said.

Total voltage variation on both outputs is ±5% including load and line regulation, centering and cross-regulation, the company said.

The LR1029 costs $59 in single quantities; OEM quantities of 1,000 cost $33 each, the vendor said.

California DC, 2150 Anchor Court, Newbury Park, Calif. 91320.
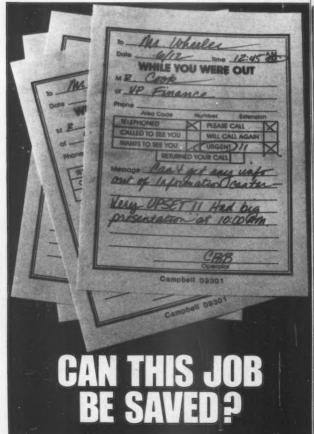
BOARD-LEVEL DEVICES

SBE, INC.
M68CPU

SBE, Inc. has announced a CPU board, based on Motorola, Inc.'s 68000 microprocessor, that also supports Intel Corp.'s Multibus. The M68CPU board is said to access 8M bytes on its companion memory boards at 10 MHz.

The M68CPU connects to its companion M68MEM memory boards using a memory bus that is separate from the Multibus. M68MEM comes in 512K-byte and 2M-byte versions. Up to four M68MEM boards can be connected to each M68CPU.

The M68CPU board costs $2,995.

SBE, 4700 San Pablo Ave., Emeryville, Calif. 94608.

MICROCOMPUTERS

Zaisan offers voice/data tool

HOUSTON — Zaisan, Inc. has unveiled the ES.3 personal workstation, which integrates an IBM Personal Computer-compatible micro with an executive voice/data terminal.

The ES.3 is the first fully IBM-compatible personal computer system designed from the ground up to integrate sophisticated telephone functions, according to Zaisan, which raised $10 million in a second round of venture capital financing last March and currently employs about 160 people.

The product combines an Intel Corp. 8088-based system with Zaisan's ES.1 voice/data station in a 15¼- by 14-in. desktop unit, the company said. A configuration featuring a 9-in. screen, 128K bytes of random-access memory (RAM), internal 300 bit/sec modem, a single disk drive and support software costs $2,595. This price tag is about $250 above the cost of a similar IBM Personal Computer, according to Donald Cooper, Zaisan marketing vice-president.

Using two telephone lines, the ES.3 supports simultaneous voice/data communications, Cooper said. The system offers a telephone directory offering single-keystroke dialing, including authorization or logon procedures, and a phone log. A calendar management function reportedly

Zaisan, Inc.'s ES.3

permits users to maintain calendar and reminder files and to send electronic messages to other ES.1 or ES.3 units. Menus allow quick definition of calendar and telephone functions, Cooper said.

The system permits single-keystroke switching between three main types of functions that run concurrently and are supported by three integrated microprocessors, according to Cooper. A Motorola, Inc. 6805 handles telephone functions; a Zilog, Inc. Z80 supports data terminal operation and personal time management software; and the 8088 chip runs IBM-compatible software.

The ES.3 runs under Microsoft Corp.'s

3Com's data communications ware links micros to minis, mainframes

MOUNTAIN VIEW, Calif. — 3Com Corp. has announced Etherterm, an asynchronous data communications software package that reportedly connects personal computers on an Ethernet-series local-area network to mainframes and minicomputers.

With Etherterm, an IBM Personal Computer reportedly can emulate an Ascii terminal and transfer files to and from a mainframe. The package supports nonintelligent terminals, including Digital Equipment Corp.'s VT100s and VT52s, according to the vendor.

"By sharing modems, communications lines and computer ports, the overall cost of these resources can be reduced," according to Larry Hartge, 3Com's product marketing manager.

Various interfaces

According to the vendor, Etherterm's interfaces reportedly include asynchronous RS-232 ports through dial-up or dedicated phone lines and interfaces to X.25 public data networks.

Etherterm uses Ethernet's Etherlink to access one of 64 ports on a Bridge Communications, Inc. gateway server, the vendor said.

Etherterm costs $700 for an IBM Personal Computer server and $1,200 for a 3Com AP server.

3Com can be reached through P.O. Box 7390, 1365 Shorebird Way, Mountain View, Calif. 94039.

Firm releases enhanced program generator for use with Dbase III

ELMWOOD PARK, N.J. — A version of Fox & Geller, Inc.'s Quickcode program generator that works with Ashton-Tate's Dbase III, reportedly provides expanded files and the ability to do calculations on the data entry screen.

Called Quickcode III, the software is written for IBM Personal Computers and Personal Computer XTs running under Microsoft Corp.'s MS-DOS 2.0 or later versions.

It expands the total number of data base files that may be open while users are working with Dbase III from one to eight, the vendor said.

Expanded file feature

Quickcode III's expanded file feature
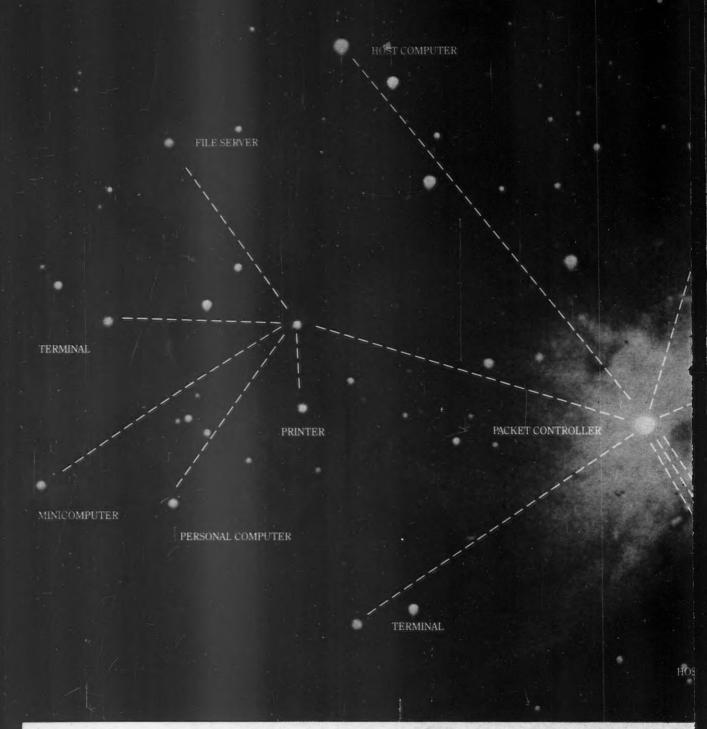
also reportedly permits files of 1,000 fields and as many as 32,000 bytes to be created for Dbase III and allows line totals, column totals and running balances to be calculated on the data entry screen.

A third new feature of Quickcode III is said to be its ability to sort and select report data automatically, using a built-in report library established by the user, the vendor said.

Quickcode III is offered to current users of Quickcode at an upgrade price of $100, the vendor said.

Dbase III users may purchase Quickcode for $295.

More information is available from Fox & Geller, which is located at 604 Market St., Elmwood Park, N.J. 07407.

Will AT&T 'pull the Unix plug?'

While AT&T's Unix System V has taken the honors as the first operating system advertised in *Sports Illustrated*, it is still far from being "the standard," as claimed by AT&T.

Many multiuser microcomputer hardware and software vendors are signing up with AT&T, and the first commercial products running System V are hitting the streets. But vendors remain understandably nervous that at some point in the future, AT&T will pull the plug. After all, to these vendors the system software represents a crucial business resource that is tightly controlled by a giant supplier competing across the board in both hardware and software.

AT&T has downplayed these fears over and over again since January 1983, when it began boosting System V for public consumption. Suppliers warily circling the AT&T camp, however, say that these assurances are not inked into AT&T's contracts, although every other conceivable concern is addressed.

An AT&T Unix contract "looks like something from a regulatory commission," according to Russell Gee, vice-president at Access Technology, Inc. in Natick, Mass., a firm that sells Unix applications.

When one document was unveiled at Comdex/Spring '84, independent vendors kept saying, " 'This is a killer contract; it has to represent a first offer that will be negotiated down over time,' " Gee maintained.

"People were either amused by it, because it weighed more than your college calculus book, or really angered by it," he said.

AT&T seems to be reinventing all the rules for software licensing, according to P. J. Plauger, president of Whitesmiths Ltd. in Concord, Mass., which offers a Unix-compatible operating system. "They're really amateurs in this."

Each time AT&T changes Unix licensing practices, according to Jim Isaak, product marketing manager at Charles River Data Systems, Inc. in Framingham, Mass., "they roll over on various people's toes. They've never been able to avoid rolling over on [Microsoft Corp.'s] toes."

More important, however, is that pull-the-plug risk.

"The concern seems to be, 'Are you hooking us now with an open Unix systems policy to skin us later with a closed policy?' " AT&T Computer Systems Division Vice-President Jack Scanlon acknowledged last month. "Our goal and commitment is to move the independent software vendors toward writing for a standard operating system — ours, System V, available on as many boxes from as many vendors as possible.

"We expect our Unix System V boxes, like everyone else's, to compete on hardware metrics," where AT&T's chip technology is a crucial advantage, Scanlon added.

INTRODUCING
AT&T INFORMATION SYSTEMS NETWORK

With this network, you're bound to shine.

The new AT&T Information Systems Network (ISN) is one of the most flexible, cost-efficient links between data processing and office devices under the sun. It builds your company's information network by linking terminals, workstations, personal computers, minicomputers and host computers, across departments, buildings or even campuses.

The network brings together a star topology, a Packet Controller with a centralized transmission bus, and a collision-free network access protocol, making it truly unique in local networks. It not only performs with high stability in data flow conditions from low-load to near peak capacity, it also distributes access to as many as 1,900 individual users. ISN even provides centralized control and administration. And because all interfaces are housed in a central cabinet, security is high. Local and remote diagnostics make the system easy to maintain and administer.

Moreover, you're always assured of fast response time because of the shortness of the network's centralized transmission bus. A combination of low-cost copper wiring and optical fiber provides you with the

MICROCOMPUTERS

Vector enhances micro line

THOUSAND OAKS, Calif. — Vector Graphic, Inc. has added a multiuser microcomputer, improved networking capabilities, increased mass storage and tape backup facilities to its microcomputer line.

Vector MS, which supports four users, includes a Zilog, Inc. Z80 and Intel Corp. 8086 microprocessors; 384K bytes of random-access memory (RAM), expandable to 896K bytes; Digital Research, Inc.'s Concurrent CP/M 86 operating system; three S-100 expansion slots; a serial port; two printer ports; and an RS-232 communications port, Vector said.

A two-user, 10M-byte Vector MX with one MT-50 terminal and 384K bytes of RAM is priced at $8,580.

Linc 3.0, Vector's local-area network, has been enhanced to support 32 rather than 16 users. Vector MX, Vector SX, Vector 4-S and Vector 4 microcomputers can be tied into Linc at a cost of $650 per computer.

Vector reportedly has increased the storage capability of its hard disk, single-user microcomputers from 10M to 28M bytes. Vector SX-4500 costs $8,895, while Vector 4-S/50 and Vector 4/50 microcomputers sell for $7,995.

To back up these systems, Vector has added 20M- and 45M-byte streaming tape systems, priced at $2,595 and $2,995, respectively.

Vector Graphic, 500 N. Ventu Park Road, Thousand Oaks, Calif. 91320.

Smart Software releases package for business analysis, forecasting

BELMONT, Mass. — Smart Software, Inc. has introduced business forecasting software with graphics, statistical data analysis and data management capabilities.

Called Smartforecasts, the software is designed for managers, planners, analysts and market researchers. It blends statistical and judgmental forecasting methods, according to the vendor.

Smartforecasts' features reportedly include multivariate regression analysis and an array of time-series forecasting methods such as exponential smoothing and moving averages, linear and exponential trend projections and "what-if" analyses.
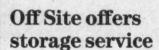
The package also provides automatic forecasting of a single data series and simultaneous forecasting of multiple data series, such as the sales of all items in a product line, according to the vendor. On-screen graphical overrides of statistical forecasts are said to be offered, as are graphical and tabular reports of forecast uncertainty.

Smartforecasts' color graphics capability reportedly is supported by such features as descriptive statistics, histograms, line graphs, scatter plots, seasonal adjustments and both auto- and cross-correlations.

The program can be used either on a stand-alone basis or to enhance a spreadsheet. Smartforecasts reportedly exchanges data files with Lotus Development Corp.'s 1-2-3 or Visicorp's Visi Calc spreadsheets. The software runs on 256K-byte models of the IBM Personal Computer and Personal Computer XT.

Smartforecasts carries a $395 price tag.

Additional information is available from Smart Software, 392 Concord Ave., Belmont, Mass. 02178.

Off Site offers storage service

NORTHBROOK, Ill. — Off Site Data, Inc. has announced an off-site data storage program specifically for microcomputer users.

Diskettes or data cartridges are stored at Off Site's Chicago facility, which is fire-protected and environmentally controlled. The program includes storage, an inventory system that provides a report of every transaction, return transportation, insurance of stored data and next-day delivery of data, according to Off Site.

The system provides escrow of source code with limited access under restricted situations. If there is no activity in a 60-day period, Off Site will remind the user to back up his data files.

For $169/year, the user can store 20 diskettes or four data cartridges. Additional space is available.
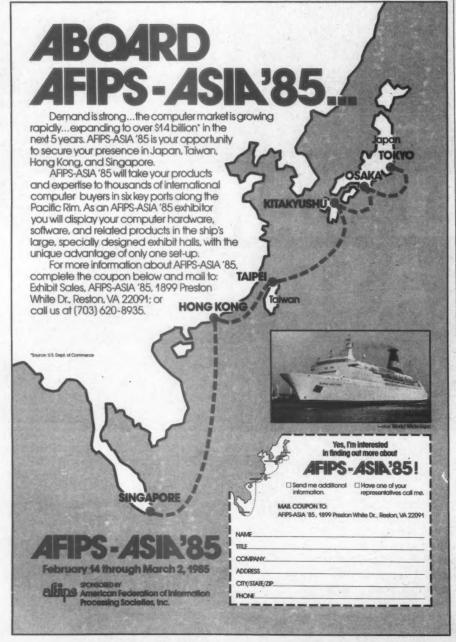
Off Site Data can be reached through P.O. Box 2067, Northbrook, Ill. 60062.

MICRO SOFTWARE

CONCEPT TECHNOLOGIES, INC.
Concept 100

Concept Technologies, Inc. has introduced Concept 100, a software and hardware package said to allow integration of text and graphics in letter-quality documents.

Concept 100, for the IBM Personal Computer XT, reportedly permits integration of graphics in drafts, final manuscripts and camera-ready copy for printing. It also is said to feature word processing capabilities and the ability to accept files from Wang Laboratories, Inc. and IBM Displaywriter word processors. Its charting soft

MICROCOMPUTERS

ware is compatible with data files from the Lotus Development Corp. 1-2-3 spreadsheet, the vendor said.

The package also reportedly supports several type fonts, pan and zoom capacity, cross-hatching and shading and color output. In addition, it can generate organizational charts, schedules and flow and block diagrams.

Concept 100 is priced starting at $2,195 and includes a mouse, diskette-based software and documentation.

Concept Technologies, P.O. Box 5277, Portland, Ore. 97208.

ZENOGRAPHICS, INC.
Mirage; Autumn; Ego

Zenographics, Inc. has introduced three graphics software products for the IBM Personal Computer.

The firm's Mirage software reportedly produces charts, maps, diagrams and text images and accepts data from external sources such as Lotus Development Corp.'s 1-2-3 spreadsheet. It is said to include a data base query system to provide graphics generation.

The Autumn application package lets users select from more than 100 types of charts, all cataloged in a chart book, according to Zenographics. Users follow menu prompts to create charts and fill in the variable data for their application, the company said.

The Ego software reportedly allows users to insert, delete, color, scale, rotate, zoom and perform other graphics editing functions.

Mirage is priced at $595. Autumn costs $295, and Ego is priced at $395, the vendor said.

Zenographics, Suite 250, 19752 MacArthur Blvd., Irvine, Calif. 92715.

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MS-DOS and is operationally compatible with the IBM machine, Cooper said. The system design includes many Cmos chips, reducing power draw and eliminating the need for a fan (with its attendant noise), he emphasized.

The product also incorporates a speakerphone, a real-time clock and a parallel printer port, Zaisan said.

Options include an internal 1,200 bit/sec full-duplex modem, an RS-232C serial and tape cassette interface, a second communications channel, expanded RAM to a total of 640K bytes, a second diskette drive and Microsoft's GW-Basic.

ES.3, a retail product, is scheduled to begin shipment next month, the company reported.

Zaisan is located at 13910 Champion Forest Drive, Houston, Texas 77069.

ZILOG, INC.
Tape drive

Zilog, Inc. has introduced a nine-track streaming tape drive that reportedly utilizes the firm's enhancement of the Unix kernel in its System 8000 supermicrocomputers.

Offered as an option to the System 8000, the nine-track drive handles ½-in., 40M-byte capacity tapes with a density of 1,600 bit/in.

The nine-track tape drive is priced at $12,450.

Zilog, 1315 Dell Ave., Campbell, Calif. 95008.

C. ITOH ELECTRONICS, INC.
PC Itoh Utilities

C. Itoh Electronics, Inc. has announced PC Itoh Utilities, a printer utility program for the IBM Personal Computer.

The program reportedly allows users to print spreadsheet graphics in color, run software written for non-C.

Itoh printers and create custom character sets, a spokesman for the company reported.

PC Itoh Utilities allows the user to print combined text and graphics on an IBM Personal Computer screen.

It also provides the user with on-line menu control of special printer functions, adjusts top-of-form positioning with variable line pitch feed and has the ability to print any Ascii file.

With the custom character

set editor, users of the PC Itoh Utilities can move, copy, replicate, invert, shift, rotate and mirror-image characters, according to the vendor spokesman.
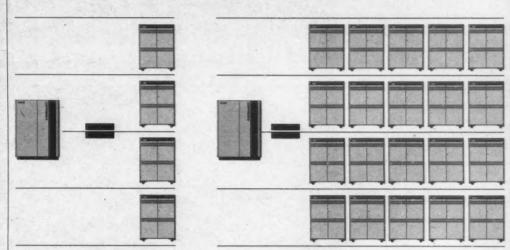
The printer utility program works with eight C. Itoh dot matrix printer models.

PC Itoh Utilities is priced at $55.

C. Itoh Electronics, 5301 Beethoven St., Los Angeles, Calif. 90066.

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SOFTWARE

TMAKER CO.
T/Maker

Tmaker Co. has announced T/Maker integrated software, an integrated word processing, spelling checker, spreadsheet, list processor, graphics and data base program.

Since all functions operate under the word processing environment, no windowing or mode shifting is required to integrate applications, Tmaker said. The word processing application reportedly features headers, footers and automatic footnote placement. Data bases may be linked to generate reports, and the spelling checker can be used with any application, according to the vendor.

The package runs on a number of microcomputers that use either Microsoft Corp.'s MS-DOS, IBM's PC-DOS or Digital Research, Inc.'s CP/M operating systems. To operate under MS-DOS or PC-DOS, 128K bytes of random-access memory (RAM) are required; microcomputers running CP/M need 64K bytes RAM for the program.

T/Maker integrated software costs $450.

Tmaker, 2115 Landings Drive, Mountain View, Calif. 94043.

CUBICOMP CORP.
Easel for CS-5

Cubicomp Corp. has introduced a version of its Easel graphics software package for its CS-5 solid-modeling design system for IBM Personal Computers and compatible systems.

The Easel software reportedly allows users to paint full-color images on their screens using a graphics tablet. Its free-stroke painting and special graphics effects options can be combined with the three-dimensional solid-modeling capabilities of the CS-5, according to the vendor.

Images drawn on a digitizing tablet on a CS-5 system running Easel reportedly appear immediately on the screen. The software is said to provide over 4,000 colors simultaneously from a palette of 16.8 million and to allow a variety of brush strokes, from paintbrush-like to airbrush style.

Easel for the CS-5 is priced at $2,450.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

FOUNTAIN HILLS SOFTWARE, INC.
Camps C3

Fountain Hills Software, Inc. has introduced Camps C3, an expert custom-circuit costing system that runs on the IBM Personal Computer and Radio Shack's TRS-80 Model 100 microcomputer.

The system reportedly determines program costs, risk factors and schedules for custom circuit design. The product is geared to managers, system designers and purchasing personnel who design custom circuits, Fountain Hills said.

Using natural language prompts, Camps C3 reportedly provides the user with a design checklist, cost recommendations and prototype schedule. The system uses graphics to depict various custom approaches.

The IBM Personal Computer version of the program sells for $395, while the TRS-80 Model 100 system

costs $195.

Fountain Hills Software, Suite 1000, 6900 E. Camelback Road, Scottsdale, Ariz. 85251.

SMALL COMPUTER CO.
Filepro 16

The Small Computer Co. has introduced the Filepro 16 data base software package for Microsoft Corp. MS-DOS-based, 256K-byte microcomputers with hard disks, including the IBM Personal Computer XT.

Filepro 16 reportedly offers the ability to set up a simple electronic filing system with automatically created screens and reports. It is driven by a menu with English-language selections and has relational capabilities that allow data to be automatically transferred between files, Small Computer said.

Filepro 16 is priced at $495.

Small Computer, Suite 1200, 230 W. 41st St., New York, N.Y. 10036.

DIGITAL RESEARCH, INC.
AT&T Personal Computer software

Digital Research Inc. has announced that several of its software products have been made available for the AT&T Personal Computer through AT&T Information Systems.

Among those products are DR Draw and DR Graph, which reportedly let users create and edit presentation-quality graphs and diagrams on monochrome or color monitors. Digital Research's DR Logo, its version of the Logo programming language, will also be offered, as will several other languages, including Cbasic and PL/I.

The products are priced as follows: DR Draw, $295; DR Graph, $195; DR Logo, $150; Cbasic, $350; and PL/I, $750.
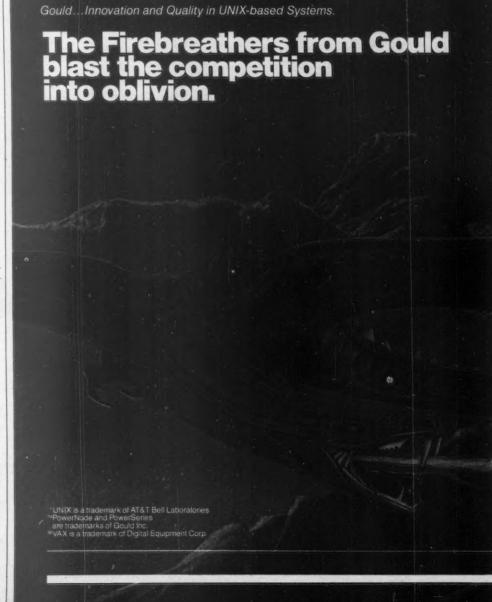
Digital Research, P.O. Box 579, Pacific Grove, Calif. 93950.

SYSTEMS

KAYPRO CORP.
Kaypro 4X

Kaypro Corp. has introduced its Kaypro 4X, which reportedly offers two high-density diskette drives, each with 2.6M bytes of storage capacity.

Called the Kaypro 4X, the new model offers the Kaypro 4's standard bundled software, the company said. Among packages in that bundle, Micropro International Corp.'s Wordstar and Ashton-Tate's Dbase II are provided on one disk, eliminating the

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need for multiple diskettes and back-ups, Kaypro said. The Kaypro 4X also has a battery-operated clock and internal modem.

The Kaypro 4X is priced at $2,495. *Kaypro, 533 Stevens Ave., Solana Beach, Calif. 92075.*

KAYPRO CORP.
Kaypro 12X

Kaypro Corp. has introduced its Kaypro 12X microcomputer, which reportedly comes with a 10M-byte hard disk storage unit and a 2.6M-byte high-density drive for 5¼-in. diskettes.

The hard disk's data reportedly can be backed up by the high-density drive on three high-density diskettes. The 12X also comes with a library of bundled software said to include Micropro International Corp.'s Word-star, Mailmerge, Datastar, Calcstar, Reportstar and Infostar; Ashton-Tate's Dbase II; and other packages.

The Kaypro 12X is priced at $3,295.

Kaypro, 533 Stevens Ave., Solana Beach, Calif. 92075.

TANDY CORP.
Dbase II for Tandy 2000

Tandy Corp. has announced that it will offer Ashton-Tate's Dbase II for the Tandy 2000 personal computer.

Dbase II is a data base management system said to be useful for the generation of reports relating to accounts receivable, accounts payable, inventory, personnel, customers, payroll and mailing lists and maintaining data on those topics.

Dbase II also reportedly can be used to sort in any desired order and to create standard or custom formatted reports. Dbase II can be used on Tandy 2000 computers with a minimum of 256K bytes of memory and either a 10M-byte hard disk and one floppy disk or two 720K-byte floppy disks.

Dbase II for the Tandy 2000 is priced at $595.

Tandy, 1800 One Tandy Center, Fort Worth, Texas 76102.

COMPUPRO SYSTEMS, INC.
System 816/G; System 816/Gg

Compupro Systems, Inc. has introduced two new microcomputers, the Systems 816/G and 816/Gg, both based on the National Semiconductor Corp. 32-bit NS32016 microprocessor and said to be fully compatible with the IEEE 696/S-100 bus.

Both models reportedly feature the choice of 80M, 40M or 20M bytes of hard disk storage or a 2.4M-byte, dual 8-in. floppy diskette subsystem. They also offer the National Semiconductor NS32082 memory management unit and NS32081 floating-point unit.

The 816/G is priced as follows: $17,495 with dual diskette drives; $19,495 with a 20M-byte hard disk unit and an 8-in. diskette drive; $19,995 with a 40M-byte hard disk unit and an 8-in. diskette drive; $23,995 with an 80M-byte hard disk unit and an 8-in. disk drive.

The 816/Gg is priced as follows: $12,495 with dual diskette drives; $14,495 with a 20M-byte hard disk unit; $14,995 with a 40M-byte hard disk unit; and $18,995 with an 80M-byte hard disk unit.

Compupro Systems, 3506 Breakwater Court, Hayward, Calif. 94545.

COMPUTER TECHNOLOGY INTERNATIONAL, INC.
Eve II

Computer Technology International, Inc. has introduced its 14-lb Eve II portable computer, which runs software written for either Apple Computer, Inc.'s Apple-DOS or Digital Research, Inc.'s CP/M operating systems.

The Eve II reportedly comes with a 5-in. monitor, two 5¼-in. half-height disk drives and a full-size typewriter-style keyboard with numeric key pad. The unit also is said to offer three Apple-compatible expansion slots, a choice of 40- or 80-col. display and 64K bytes of memory.

Processors in use in the Eve II reportedly are the Intel Corp. 6502 and the Zilog, Inc. Z80. The Eve II's interfaces are said to include an RS-232 serial port, a Centronics Data Computer Corp. parallel printer port, a joystick port and an external monitor jack. A canvas carrying case is included.

The Eve II portable costs $1,595.

Computer Technology International, 200 Murrary Hill Pkwy., East Rutherford, N.J. 07073.

ISI INTERNATIONAL CORP.
ISI 6160

ISI International Corp. has introduced a microcomputer designed for industrial use that is said to be compatible with the IBM Personal Computer XT.

According to the manufacturer, the ISI 6160 uses Microsoft Corp.'s MS-DOS operating system and GW Basic and is compatible with Digital Research, Inc.'s Concurrent CP/M.

The ISI system includes one or two double-sided, double density, 5¼-in. floppy disk drives and optional 10M-, 20M- or 30M-byte Winchester drives,

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according to the vendor. It reportedly supports IBM Personal Computer-compatible monochrome and color/graphics monitors and keyboards.

The system features a 4.77-MHz Intel Corp. 8088 chip, a socket for an Intel 8087 math coprocessor and 128K bytes of RAM (expandable to 256K bytes).

The 6160 will be available in August and can be ordered in minimum quantities of 25.

Price for the system with a single floppy drive is $2,090. *ISI International, 1275 Hammerwood Ave., Sunnyvale, Calif. 94089.*

COMMUNICATIONS

QUADRAM CORP.
Quad 3278

Quadram Corp. has announced Quad 3278, a terminal emulation and screen capture board designed for the IBM Personal Computer.

Quad 3278 emulates an IBM 3278 terminal and allows the microcomputer to access an IBM mainframe via a 3270 series control unit, Quadram said.

Quad 3278, which includes an interface card, user manual and software, is priced at $1,195. A 100-ft coaxial cable sells for $95.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

GATEWAY MICROSYSTEMS, INC.
Microgate/WS

Gateway Microsystems, Inc. has introduced Microgate/WS, a communications product for IBM Personal Computers with IBM's PC-DOS 1.1 operating system.

The product provides both interactive and batch microcomputer-to-mainframe communications capabilities, Gateway said. In interactive mode, it reportedly transforms the IBM Personal Computer into an IBM 3270 series terminal. In batch mode, the product is said to mimic an IBM 2780 or 3780 terminal.

Microgate/WS's features are said to include attended command mode for direct user control; batch commands for unattended operation; error detection, retries and looping within command files; Ebcdic, Ascii and transparent text transmission and reception; and on-line Help screens.

Microgate/WS, priced at $995, includes the Gateway Serial Communication Controller and the software to drive it.

Gateway Microsystems, Suite 105, 9501 Capitol of Texas Highway N., Austin, Texas 78759.

TECHLAND SYSTEMS, INC.
Bluelynx Gateway

Techland Systems, Inc. has introduced Bluelynx Gateway, which transforms an IBM Personal Computer into a 3274 controller and allows other users to communicate with an IBM mainframe.

The product reportedly will support uploading and downloading of files and 16 concurrent mainframe sessions, Techland said. Bluelynx Gateway is designed for a number of local-area networks, including those from Davong Systems, Inc., Novell Data Systems, Inc. and Xcomp, Inc.

A Bluelynx Gateway configuration of four users, which includes communications boards for IBM Personal Computers, costs between $2,000 and $2,500.

Techland Systems, 25 Waterside Plaza, New York, N.Y. 10010.

PATHWAY DESIGN, INC.
Pathway Design/BSC-RJE

Pathway Design, Inc. has announced Pathway Design/BSC-RJE, which provides micro-to-mainframe file transfer in an IBM 2780 or 3780 RJE-emulated mode and communications between remote personal computers in a 3780-emulated mode.

Among package features are user exits that maintain the host session while executing local personal computer sessions and support of wild-card characters for file concatenation, according to Pathway.

The package runs on the IBM Personal Computer, Compaq Computer Corp. Compaq, Sperry Corp. Personal Computer and Wang Laboratories, Inc. Professional Computer. It works with Pathway's communications adapter board and adapter cable.

Pathway Design/BSC-RJE is available for $595.

Pathway Design, 177 Worcester St., Wellesley, Mass. 02181.

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APPLIED INTELLIGENCE, INC.
Netview

Applied Intelligence, Inc. has introduced Netview, its windowing enhancement for the firm's PC/NOS network operating system that reportedly provides users access to and control of network resources.

Netview is said to be a window-based command processor that allows users to browse the network and locate resources and specialized network applications. The software ties to resources via a connection language that allows users to connect hardware and software to specific workstations with windowing manipulation, Applied Intelligence said.

Netview's windows appear by positioning the cursor at a specific menu item, the vendor said. Other features reportedly include the ability to allow resource owners to establish access privileges for other users on the network, based on the user's group name or access level.

Netview is priced in two parts: user-mode software at $250 and back-end software at $650.

Applied Intelligence, 1043 Stierlin Road, Mountain View, Calif. 94043.

UNGERMANN-BASS, INC.
Personal Network Interface Controller

Ungermann-Bass, Inc. has announced a network interface controller for connecting IBM Personal Computers and selected compatible microcomputers to its Net/One local-area network system.

According to a spokesman, the Personal Network Interface Controller (Personal NIC) plug-in board is compatible with other Net/One Personal Connection products and gives users the same network capabilities as the company's Personal Network Interface Unit. The product is said to be designed for use in Personal Computer workstations and to execute its protocols in the Personal Computer.

Personal NIC's high network throughput reportedly is derived from its packet-handling techniques, which utilize 12K bytes of receive buffers and 4K bytes of separate transmit buffers. The product is said to support all Net/One media and to permit use of the full range of Net/One and Personal Connection software.

The Personal NIC is priced at $595.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

M/H GROUP
Textcom

The M/H Group has introduced Textcom, which reportedly permits communications between IBM Personal Computers running Multimate International Corp.'s Multimate and Wang Laboratories, Inc. systems.

Textcom reportedly maintains document integrity between Multimate and Wang systems. It is said to consist of a circuit board that fits into one of the Personal Computer's expansion slots, a Personal Computer software diskette and cabling.

Documents sent by Textcom are usable immediately after being received or sent, the vendor said. Textcom's user interface is said to be menu-oriented and not to require document names to be typed when sending from the Personal Computer.

Textcom is priced at $1,200.
M/H Group, 222 W. Adams, Chicago, Ill. 60606.

CORE TECHNOLOGY CORP.
Bridge

Core Technology Corp. has announced Bridge, a communications system that connects a Texas Instruments, Inc. Professional microcomputer to a Burroughs Corp. mainframe or minicomputer.

Bridge reportedly provides Burroughs TD830 terminal emulation and file transfer capabilities. Standard TD830 functions supported include status line, multiple pages, background printer address and reverse video, Core said. Bridge is said to feature on-line Help, multiple configuration files, user definition of the number of pages displayed and a line monitor.

Bridge consists of Bridge I ($495), a TD830 terminal emulation program; Bridge II mainframe Dcspooler ($1,195); and Bridge II Micro Dcspooler ($495).

The program requires a Professional with 128K bytes of random-access memory, a disk drive, Microsoft Corp.'s MS-DOS 2.0 operating system and a synchronous or asynchronous serial card.

Core Technology, Suite A, 1900 W. Stadium Blvd., Ann Arbor, Mich. 48103.
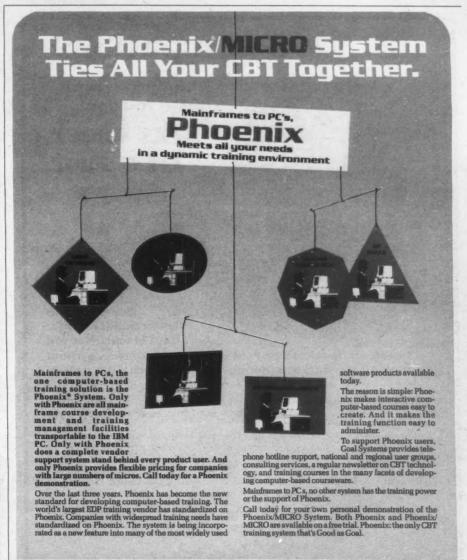
PROTOCOL COMPUTERS, INC.
PCI-Link

Protocol Computers, Inc. (PCI) has announced PCI-Link, a mainframe-to-personal computer communications package.

PCI-Link reportedly supports concurrent asynchronous and synchronous sessions through the product's windowing features. The product includes Help screens, a status line, on-line notepad, modem support, password security, diagnostics, on-line screen management and printer control, PCI said.

Keyboard-mapping functions reportedly allow the user to replicate IBM 3278 terminal functions with a personal computer keyboard or mouse. The product also includes pop-up menus and macros of up to 4,000 characters, the vendor spokesman said.

The program requires Microsoft Corp.'s MS-DOS 2.0 or IBM's PC-DOS 2.0 operating systems, a double-sided disk drive, 80-col. display, asynchronous communications adapter and

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256K bytes of random-access memory.

PCI-Link costs $995, according to the vendor.

PCI, 6150 Canoga Ave., Woodland Hills, Calif. 91367.

UNIQUE AUTOMATION PRODUCTS CO.
UAP-Link for DEC Professional

Unique Automation Products Co. has introduced a version of its UAP-Link file transfer software for the Digital Equipment Corp. Professional microcomputer executing RT-11.

Using UAP-Link, users reportedly can call any Ascii-based time-sharing facility and move text files with no special host software. Host computers with a companion UAP-Link module reportedly can transfer error-free binary and text files with data compression, correct formatting and automatic sessions.

UAP-Link companion modules reportedly are available for the DEC 325, 350 and Rainbow; DEC systems under RT, RSX, RSTS and VAX-11/VMS; the IBM Personal Computer and IBM systems under VM/CMS; and systems under Unix.

The UAP-Link module for the DEC Professional is priced at $500, the vendor said.

Unique Automation Products, Suite G, 15401 Red Hill, Tustin, Calif. 92680.

FORTUNE SYSTEMS CORP.
3270 terminal emulator software

Fortune Systems Corp. announced a 3270 interactive terminal emulation software and hardware package that permits Fortune Systems' 32:16 desktop computer users to access IBM mainframes or non-IBM systems that support an IBM 3276 Model 2 cluster controller unit.

Fortune's 3270 emulator allows the 32:16 to mimic an IBM 3276 Model 2 cluster control unit, an IBM 3278 Model 2 display terminal or an IBM 3278 Model 1 or 2 printer, according to the vendor. The emulation package reportedly supports up to three concurrent users while additional users perform tasks on other Fortune-supplied software.

An intelligent communications controller handles all line synchronization and data transfer between the Fortune system and the IBM or IBM-like host. The 3270 terminal emulator software costs $995. The intelligent communications controller board costs $995.

Fortune Systems, 101 Twin Dolphin Drive, Redwood City, Calif. 94065.

MOLECULAR COMPUTER
Cleo-3270; Cleo-3780

Molecular Computer has introduced two communications software packages, Cleo-3270 and Cleo-3780, that reportedly link its multiuser business systems to IBM mainframes.

The Cleo-3270 emulates an IBM 3276/2 display controller and supports up to eight 3278 interactive display terminals or 3287 printers, Molecular said. The Cleo-3780 reportedly emulates an IBM 3780 remote batch workstation for high-speed transmission and reception of data files over telephone lines.

Both packages are said to support up to 9,600 bit/sec transmission. Both are available on 8-in., single-density or 5¼-in. double-sided, double-density diskettes.

The Cleo-3270 costs $995; the Cleo-3780 costs $495.

Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

TANDY CORP.
T-176 SNA/SDLC

Tandy Corp. has introduced the T-176 SNA/SDLC, a protocol converter that reportedly allows the firm's TRS-80 microcomputers to communicate with IBM Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) networks.

For use on the Tandy 2000, TRS-80 Model 12 and Model 4/4P, DT-1 and DT-100, the product emulates an IBM 3276 controller and allows TRS-80 microcomputers or various terminals to emulate IBM 3278 devices, Tandy said.

The product reportedly allows users to determine the availability of the local communications link, the SDLC communications status and see all SNA information. According to Tandy, both address and control bytes of the SDLC line can be displayed, and each terminal can display its own SNA frames.

When used with TRS-80 microcomputers emulating Digital Equipment Corp.'s VT100 terminal, the T-176 reportedly gives the user the capabilities of an IBM 3270 terminal. Maximum speed of the converter is 9,600 bit/sec.

The communications controller is available in configurations of one to seven ports. A seven-port version sells for $4,300.

Tandy, 1800 One Tandy Center, Fort Worth, Texas 76102.

NEW ERA TECHNOLOGIES, INC.
Conexus
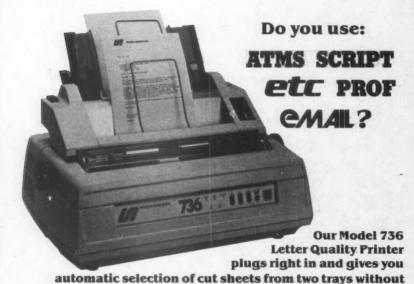
New Era Technologies, Inc. has introduced Conexus, an integrated electronic mail, computer teleconferencing and bulletin board system for the IBM Personal Computer, Personal Computer XT and compatible systems.

Conexus reportedly can be used in a local-area network or via telecommunications. It is said to offer group conferencing and keyword-accessible bulletin boards for up to 1,000 users, each with their own ID, password or one of eight different access levels.

Electronic mail is delivered automatically by Conexus at the time of sign-on and can be answered, forwarded or copied to a conference, ac-

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cording to New Era. Mail can be sent under pen names, and users can trace the receipt status of messages and modify the message before it is received, the vendor said.

Conexus is priced at $624.

New Era Technologies, Suite 924, 2025 Eye St. N.W., Washington, D.C. 20006.

WINTERHALTER, INC.
Datatalker/MAC

Winterhalter, Inc. has introduced its Datatalker/MAC, a front-end communications processor for the Apple Computer, Inc. Macintosh.

The Datatalker/MAC reportedly allows the Macintosh to emulate the following IBM terminals: 3271, 3277, 3274, 3278, 3275 and 3276. The unit's controller includes an alarm, device addresses, a control unit and transmission parameters that are user modifiable, the vendor said. Also included are selectable Ascii and Ebcdic transmission code, according to Winterhalter.

The Datatalker/MAC also reportedly supports all IBM 3270 function keys. Terminal characteristics include a display of 1,920 characters in 24 lines, the vendor said. IBM 3270 status indicators are said to be displayed on the screen.

Datatalker/MAC reportedly operates at 9,600 bit/sec. It is priced at $1,095.

Winterhalter, P.O. Box 2180, 3853 Research Park Drive, Ann Arbor, Mich. 48106.

MAY-CRAFT INFORMATION SYSTEMS, INC.
Forte-Graph

May-Craft Information Systems, Inc. has announced Forte-Graph, which allows an IBM Personal Computer to access mainframe graphics packages by emulating an IBM 3279 Model S3G terminal.

By hitting a single keystroke, the user can move from microcomputer to mainframe session, May-Craft said. The product works in conjunction with May-Craft's PJ 3278/79 emulator board.

Forte-Graph costs $1,395 and Forte PJ 3278/3279 costs $1,195. Host-based, file-transfer capabilities can be added for $1,000.

May-Craft Information Systems, 4312 Beltwood Pkwy. S., Dallas, Texas 75234.

STORAGE

BERING INDUSTRIES, INC.
Sponge Model T100

Bering Industries, Inc. has announced a tape drive sub-

system for Hewlett-Packard Co.'s personal and technical computers.

The Sponge Model T100 is a 20M-byte tape drive subsystem for the HP Series 80 and 200; HP 150, 120/125, 250 and 1000; and HP 9800 series desktop computers. It is plug-compatible with the 9134X disk subsystems or an equivalent. According to the vendor, optional drivers make it compatible with IEEE-488 or HP-IB interface systems.

The Sponge reportedly provides a backup for an entire 9134X-type hard disk without the use of a computer. A 64K-byte cache memory, included to improve the performance of the random read and write operations, gives the ability to emulate a hard disk, according to the vendor.

The Sponge is priced at $2,380.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94539.

TEXAS INSTRUMENTS, INC.
Winchester disk drive option

Texas Instruments, Inc. has introduced an 18.2M-byte Winchester disk drive option for its Professional Computer.
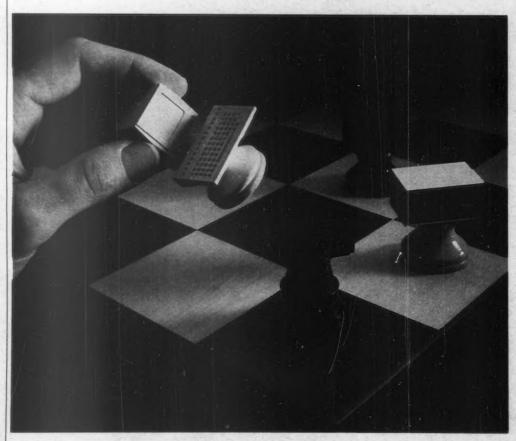
The Winchester disk drive option is said to be compatible with Microsoft Corp.'s MS-DOS 1.25 and 2.1 and to have applications in local-area networks and where large data bases are needed.

The Winchester option offers more than twice the access speed of comparable 10M-byte hard disk storage units and will fit inside the microcomputer's case, the vendor said.

The 18.2M-byte Winchester disk option is priced at $2,995, including diagnostics software, controller board, installation manual and cables.

TI, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

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PRINTERS/ PLOTTERS/ PERIPHERALS

STAR MICRONICS, INC.
PC Printers

Star Micronics, Inc. has introduced a line of IBM Personal Computer-compatible printers that reportedly also works with IBM Personal Computer-compatible systems.

The PC Printers are said to offer dot-matrix impact printing in both 10- and 15-in. versions. They provide the features of the firm's Radix-10 and Radix-15 printer line, including two print speeds, a 16K-byte buffer and print sizes of 5, 6, 8.5, 10, 12 and 17 char./in., according to the vendor.

The devices also reportedly provide standard Ascii characters, the ability to handle many kinds of paper and a user-replaceable print head with a life expectancy of more than 100M char.

The Radix-10 PC Printer is priced at $849. The Radix-15 PC Printer is priced at $995, the vendor said.

Star Micronics, 200 Park Ave., New York, N.Y. 10166.

QUADRAM CORP.
Quadchrome II

Quadram Corp. has introduced Quadchrome II, a color monitor for the IBM Personal Computer.

The monitor, equipped with a 14-in. tube, delivers a resolution of 640 by 240 pixels and is designed for graphics applications, Quadram said.

The product reportedly can display 16 colors simultaneously in its 25-line by 80-char. format.

The Quadchrome II monitor is priced at $650, according to the vendor.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

AT&T INFORMATION SYSTEMS
Printer series

AT&T Information Systems has introduced six new printers: Models 470, 473, 475, 455, 457 and 458.

The Model 470, 473 and 475 reportedly are 120 char./sec dot matrix printers, which are equipped with various interfaces. The Model 470 ($695) has a Centronics Data Computer Corp. parallel interface, the Model 473 ($695) features an IBM Personal Computer Centronics parallel interface and the Model 475 ($745) possesses an EIA RS-232C interface.

The Model 455, a 55 char./sec, letter-quality daisy-wheel printer, offers three operator-installable interface modules: Centronics parallel, IBM Centronics parallel and serial RS-232, AT&T said. Options reportedly include a tractor-feed attachment, automatic sheet feeder, paper catch basket and a cover that reduces noise to 55 db. The Model 455 costs $1,995.

The Model 457 and 458 printers, priced at $1,495, are 45 char./sec, letter-quality daisywheel printers with tractor-feed and automatic sheet feeder options, AT&T said.

AT&T Information Systems, One Speedwell Ave., Morristown, N.J. 07960.

INTEGREX, INC.
Colourjet 132

Integrex, Inc., has introduced its Colourjet 132 ink-jet printer, which is said to offer 36 colors and up to 252 dot/in. resolution.

The Colourjet 132 reportedly is compatible with the IBM Personal Computer, for which a screen dump disk is available. The device can print 132 columns compressed and 80 columns normal, Integrex said.

It also reportedly offers double-width, double-height and double-size printing along with underline, italics and programmable foreground and background colors.

According to the vendor, the Colourjet 132 also prints in full videotex format from a Centronics Data Computer Corp. parallel input.

The Colourjet 132 is priced at $795.

Integrex, 233 N. Juniper St., Philadelphia, Pa. 19107.

EXTENDED SYSTEMS, INC.
Sharespool controllers

Extended Systems, Inc. has announced two shared printer controllers as part of its Sharespool family of controllers.

The ESI-2016 Sharespool reportedly uses an option slot in an IBM Personal Computer XT which allows up to

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three additional microcomputers, which would include an IBM Personal Computer XT and any two other personal computers, to share an RS-232C interfaced printer.

The ESI-2018 also uses an IBM Personal Computer XT option slot and allows three personal computers to share a Centronics Data Computer Corp.-compatible parallel printer, the vendor said.

Each product reportedly features up to 64K bytes of spooler buffer memory and is transparent to the user.

The ESI-2016 and ESI-2018 Share-spool controllers are available now and cost $595 each, according to the vendor.

Extended Systems, 6062 Morris Hill Lane, Boise, Idaho 83711.

CENTRONICS DATA COMPUTER CORP.
Model 351-PC

Centronics Data Computer Corp. has unveiled a multifunctional dot matrix printer that works with IBM's Personal Computer.

The Model 351-PC features three-way forms handling of fanfold, demand document and single cut sheets, Centronics said. Model 351-PC is said to print at a speed of 200 char./sec in draft mode and 65 char./sec in proportional, multiple-pass, near-letter-quality mode.

The printer supports pin-addressable graphics, self-test diagnostics, bidirectional, logic-seeking printing and operator selection of page length.

Model 351-PC sells for $2,195.

Centronics Data Computer, One Wall St., Hudson, N.H. 03051.

EXTENDED SYSTEMS
ESI-6002 Shareplot

Extended Systems has introduced ESI-6002 Shareplot, which provides a 64K-byte print buffer for Hewlett-Packard Co. 7470A, 7475A and 7550A plotters used with the HP 150 micro.

By using one expansion slot, Shareplot reportedly allows three HP 150s to share a plotter. ESI-6002 Shareplot utilizes intelligent buffer management and job recognition algorithms to plot each successive job.

The product reportedly supports two modes of operation, single sheet and sheet feed.

ESI-6002 Shareplot costs $485. An additional 64K-byte buffer costs $80.

Extended Systems, P.O. Box 4973, 6062 Morris Hill Lane, Boise, Idaho 83711.

LASERGRAPHICS, INC.
Rascol

Lasergraphics, Inc. has introduced its Rascol printer controller, a microprocessor-based raster color image maker for the IBM Personal Computer and other microcomputers.

The Rascol controller reportedly receives high-level graphical objects from a Lasergraphics language driver in the host computer and rasterizes them into color dots to drive the accompanying printer, leaving the personal computer free for other functions.

The controller links to personal computers via an RS-232C port or a Centronics Data Computer Corp. 8-bit parallel interface.

The Rascol is said to be compatible with the Diablo Systems, Inc. C-150 printer and Xerox Corp. 1770 color ink-jet printers.

The Rascol is priced at $1,995.

Lasergraphics, 17671 Cowan Ave., Irvine, Calif. 92714.

APPLE COMPUTER, INC.
Applecolor Monitor 100

Apple Computer, Inc. has announced a 12-in. red, green and blue monitor that works with the Apple IIe, Apple III and Apple III Plus personal computers to produce color display of both text and graphics.

The Applecolor Monitor 100 includes an 80-column text display for data processing, color display for business graphics applications and capabilities for mixing the two, the company said. The monitor includes a screen tilting mechanism and an antireflective screen surface.

Apple's Extended 80-Column Text/Applecolor Card is required to connect the monitor to the Apple IIe computer. The card supports 80-column text display and 64K bytes of internal memory, expanding the IIe's total internal memory to 128K bytes. The monitor plugs directly into the built-in color video port of either the Apple III or III Plus.

The Applecolor Monitor 100 is available for $599. The 80-Column Text/Applecolor Card sells for $299.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.

MICRO PROJECTS ENGINEERING, INC.
Xcalibur
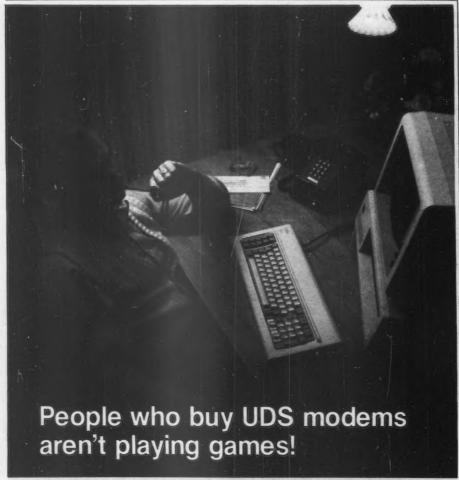
Micro Projects Engineering, Inc. has introduced a 16-bit upgrade peripheral for Tandy Corp.'s TRS-80 Models I, III and 4 and LNW Research Corp.'s LNW Model II computers.

Operating under Microsoft Corp.'s MS-DOS Version 2.11, the Xcalibur reportedly can be mounted internally or externally and is compatible with 16-bit software available for the IBM Personal Computer.

An optional monochrome video display card allows the TRS-80 to execute such programs as Lotus Development Corp.'s 1-2-3 and Multimate.

Xcalibur sells for $495 for a 64K-byte card and includes MS-DOS and IBM Personal Computer expansion capabilities. Options include random-access memory expansion to 256K bytes, IBM Personal Computer serial RS-232 parallel printer ports, 80-character by 25-line monochrome video display card, power supply and enclosure.

Micro Projects Engineering, Suite B, 3951 Higuera St., Culver City, Calif. 90230.

COMPUTER INDUSTRY

IBM's compromise: Symbolic or substantive agreement?

By Peter Bartolik
CW Staff

After more than a decade of getting its own way in antitrust challenges, IBM's recent compromise with the European Economic Community (EEC) represents a symbolic surrender by the world's largest computer vendor to government regulation of economic markets.

Few observers and participants in the information services industry have placed much significance on the actual disclosure requirements by which IBM has agreed to abide. Yet, in contrast to the U.S. Justice Department's 1982 surrender in its own antitrust action against IBM, the EEC's commission did obtain from IBM a written declaration to abide by certain guidelines.

The Justice Department, after a decade-long dispute, simply folded its

ANALYSIS

IBM Chairman John R. Opel: No "significant changes"

hand and declared the U.S. antitrust case was "without merit."

The EEC, on the other hand, won from IBM the pledge to unbundle main memory, disclose sufficient interface information to allow competing companies to attach hardware and software to 370 series equipment and to release interface information in a timely manner.

The initial reaction from U.S. industry observers was that the compromise was a means of the EEC saving face by obtaining a written set of principles from IBM, but essentially not winning any substantive concessions.

The most enthusiastic response from an IBM competitor was at Amdahl Corp., where spokesman Richard Whitcob said: "There was no understanding prior to this that IBM would in

See EEC page 124

IBM's monopoly seen distorting market

By Peter Bartolik
CW Staff

Monopolistic power, in and of itself, distorts the rewards system that would normally spur innovation in a free market economy, according to the economist who played a key role in the U.S. government's decade-long and ultimately unsuccessful antitrust action against IBM.

Dr. Alan F. McAdams, an economist at Cornell University, was an expert witness and chief economic adviser to

the U.S. Justice Department's trial team in the *U.S.* v. *IBM* antitrust suit that was dismissed at the government's behest in January 1982.

In a recent interview, McAdams said of the recently concluded European Economic Community (EEC) action against IBM: "There couldn't be a clearer demonstration of the power of IBM. The EEC has backed down.... It is pretty clear the EEC backed down substantially from what it initially intended."

See IBM page 123

INDUSTRY INSIGHT
David Olmos
CW Staff Writer

Fujitsu's strategy in U.S. explained

Of the various Japanese computer companies seeking to capture a bigger share of the U.S. market, none has a larger presence than Fujitsu Ltd. The largest computer maker in Japan, with revenues roughly comparable to Digital Equipment Corp. (about $4.4 billion in 1983), Fujitsu has a marketing arm in the U.S. in its wholly owned subsidiary, Fujitsu America, Inc.

Fujitsu America, founded in 1976, had estimated sales of about $300 million in 1983, according to market research firm International Data Corp. Fujitsu America functions as the parent organization of three other major subsidiaries: Fujitsu Microelectronics, Inc., which markets semiconductors and microcomputers; Fujitsu Systems of America, Inc., which markets point-of-sale and financial systems; and American Telecom, Inc., which markets private branch exchanges and key telephone systems. Fujitsu also owns a 49% stake in Amdahl Corp.

In a recent interview, Rinzo Iwai, president of Fujitsu America, discussed the Japanese giant's operations and strategy in the U.S., as well as its relationship with Amdahl.

Fujitsu's four subsidiaries employ about 1,700 people, about 94% of whom are American, according to Iwai. A majority of top-level managers are also American, including the presidents and chief executive officers of two of the units.

See IWAI page 126

Global-USI acquires Magnuson in bankruptcy settlement

By David Olmos
CW Staff

SAN JOSE, Calif. — Magnuson Computer Systems, Inc., a maker of IBM-compatible mainframes, has been formally acquired by Global-Ultimac Systems, Inc. (Global-USI), a majority-owned subsidiary of Storage Technology Corp.

The acquisition comes nearly 1½ years after Magnuson scrambled for protection from creditors under Chapter 11 of the Federal Bankruptcy Act when its once-prosperous business crumbled in the early 1980s due to competition from IBM.

Under the previously announced reorganization plan approved in California Federal District Court here, Global-USI, a Boulder, Colo., computer maker, will acquire virtually all of Magnuson's assets. In exchange, a private investor group that held most of Magnuson's $8 million in secured debt will receive 705,680 shares of Global-USI stock, valued at less than $6 million, according to Magnuson.

Global-USI, which is 53% owned by Storage Technology, will acquire Magnuson's inventory of IBM 4300-

'We're finding ourselves in a market niche that essentially has been abandoned by everybody except IBM and us.'
— George Pilmanis, president, Global-Ultimac Systems, Inc.

series-compatible computers, design and manufacturing rights and other assets. Nearly all of Magnuson's remaining 60 employees will go to work for Global-USI. Those employees will be headquartered at Magnuson's San Jose, Calif., computer manufacturing plant, which has also been transferred to Global-USI.

The plan also requires that approximately $2.3 million in cash be set aside to settle partially all other creditors' claims allowed by the court and administrative expenses. Magnuson's unsecured creditors have filed claims totaling about $20 million.

Global-USI, which together with Storage Technology has been virtually Magnuson's only customer, manufactures IBM plug-compatible computer systems, minicomputer

turnkey systems and applications software.

George Pilmanis, president of Global-USI, said his company has been using Magnuson's IBM 4300-series-compatible processors and Storage Technology peripherals as part of its turnkey systems, which have found a place in such niche markets as manufacturing and distribution. He said the turnkey systems compose about one-third of the company's total business and "have been doing very well for us.

"The other reason for [the purchase] was to acquire [Magnuson's] field engineering group and a customer base," Pilmanis said. "The field engineering group essentially allows us to double our field service group, and that opens up more cities for

marketing."

Global-USI plans to continue making the Magnuson computer, but will market it under its own name. The company also will be responsible for servicing the installed base of the Magnuson systems.

According to Pilmanis, the company acquired an inventory that "will allow us to fulfill all our marketing plans for this generation of equipment.

"Our major concern now is to have a next-generation CPU that will allow us to continue to be competitive, and we're working on that," he added. He said the new machine will be aimed at the IBM DOS marketplace and will probably originate through an outside source and be marketed through an OEM agreement.

"We're finding ourselves in a market niche that essentially has been abandoned by everybody except IBM and us," Pilmanis said.

As part of the agreement, Q. T. Wiles, chairman of Hambrecht & Quist, Inc., a San Francisco-based venture capital firm, will join the Global-USI board of directors.

COMPUTER INDUSTRY

U.S. needs Japanese approach to do business in Japan

OUTSIDE LINES
Alonzo D. Saunders

This is the second of a two-part series

Japan's intellectual property laws have been a sore point for Americans for some time. The good news is that the old system is to be scrapped. But the bad news is that under proposed legislation, Japanese copyright (C/R) law would be placed under the Ministry of International Trade and Industry (Miti).

Miti's responsibility is the promotion of industry and not the protection of software rights. This promotional approach has drawn severe criticism from the Japanese themselves. An editorial in Japan's leading business newspaper, *Nihon Keizai Shimbum*, claimed that "This law makes the period of protection 15 years, far shorter than the 50 years offered under [C/R] law. Items not in the C/R law are also included — such as the right to make changes ... without the developer's permission and an arbitration system, which can require licensing under certain conditions."

Miti's approach also allows the Japanese to close the software gap, American critics believe, given the disclosure requirements of the software registration system. Miti officials were forthright in stating that this law signals a major shift in emphasis away from hardware to software.

The discriminatory barriers imposed by Japanese law have been illustrated in recent attempts by the U.S. government to "liberalize" Japan as a market. The U.S. claims that Japan denies business an "equal competitive opportunity." Government-to-government negotiations regarding the entry and participation of non-Japanese financial institutions have resulted in some gains, and the U.S. Department of Commerce is pleased with its efforts to force Miti to make the C/R laws more palatable.

U.S. officials are now saying that they will push hard for implementation of agreements now on the books, such as the NTT (Nippon Telegraph & Telephone) purchasing agreement and the agreements regarding the value-added networks, lest those agreements become paper tigers.

Business-to-government activity is also picking up. The American Electronics Association has opened its first non-U.S. office in Tokyo. That office, headed by a legal specialist in Japan-U.S. trade, will, among other efforts, monitor, review and lobby regarding Japanese laws.

Of course, the Japanese can exert pressure too. One reason for the collapse of many Japanese-American joint ventures is that the government forced companies into partnerships that, with 20-20 hindsight, simply could not work. Having a Japanese face has always been important in doing business in Japan, so the local partner must often have de facto control, if not de jure control, of the operation. Many of these failed ventures are now painfully untangling, and buy outs and dissolutions are being seen with increasing frequency.

Government can be pleasant

But if the government can be heavy-handed, it can also be quite pleasant when it suits Japanese needs. The Japanese economy is in a slump. There have even been layoffs involving management personnel. As a result, the Japanese government wants foreign companies to pick up the slack, and it has been offering deals involving loans, land and other concessions.

The problem with the legal system is that where there is protectionism, favoritism or discrimination, all enforced by law (or, seemingly, by custom), there is no recourse to the Japanese courts. Many changes will, therefore, have to be made at a policy level by trade associations, the threat of U.S. government retaliation and individual company involvement.
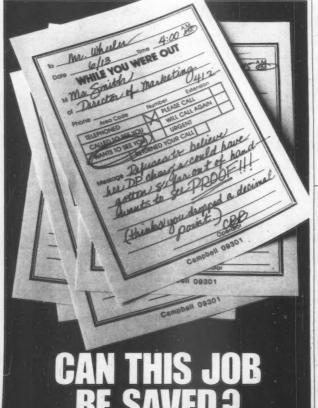
With respect to the garden-variety commercial legal matters, there is of course the availability of the courts, a vigorous bar and a well-trained judiciary. Since closing a deal in Japan has all of the elements of a ritual that includes along the way the execution of a contract, the contract does not have the singular weight that it has in America. But most executives know that some memorialization of a transaction is always required at least as a basis for negotiation because, writes Zentaro Kitagaw, professor of law at Kyoto University, in *Doing Business in Japan,* "The most frequently used means (for problem resolution) is direct negotiation between the disputants themselves."

Finally, if the Japanese are feeling an economic pinch and concessions are becoming available, American companies may be better able to negotiate more favorable terms that could tie them in more closely to the fabric of commercial life: the local governments and the Industrial Councils.

Doing business in Japan requires a legal strategy tailored to Japan: a commitment to long-term, extensive lobbying; excellent trade relations; access to rule-making procedures; and a local law firm to handle ordinary commercial activity, such as the institution of joint ventures and registration with the local authorities, all mixed with a dash of patience.

Saunders is a Boston-based attorney with a practice focusing on international marketing, antitrust and corporate finance.

Comdisco reports revenues down
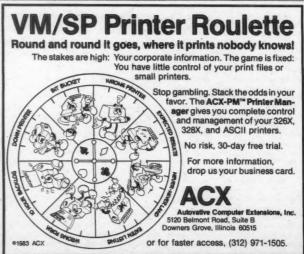
ROSEMONT, Ill. — Comdisco, Inc. recently reported third-quarter profits of $6.9 million, or 25 cents per share, representing a 47% decline from the comparable quarter a year ago, when profits were $13.1 million, or 45 cents per share.

Revenues for the third quarter ended June 30 were $133.1 million, a 4.4% increase over the $127.4 million reported a year earlier.

Comdisco said the decline in earnings was primarily due to a decrease in the volume of tax-advantaged transactions. The Internal Revenue Service this past January initiated a review of the transactions, but completed the review in May without taking any adverse action.

In April, Comdisco reported profits of $4.05 million, or 14 cents per share, compared with year-earlier profits of $10.3 million, or 35 cents per share.

For the first nine months of fiscal year 1984, Comdisco's revenues were $415.7 million, a 3.5% increase over the first nine months of fiscal 1983.

Subcommittee questions benefits of R&D tax credit

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The computer industry's bid to make the 25% federal tax credit for research and development a permanent part of the tax code was dealt another setback at recent congressional hearings when several researchers questioned the credit's effectiveness.

The hearings were held Aug. 2-3 by the U.S. House Ways and Means Committee's Subcommittee on Oversight, which is gathering testimony to guide next year's deliberations on the fate of the R&D credit that is scheduled to expire on Dec. 31, 1985. A proposal to extend the R&D credit permanently was rejected by House Ways and Means Committee members during consideration of this year's tax legislation [CW, July 9].

"Our mission is to find out whether we're wasting money," the subcommittee chairman, Rep. Charles B. Rangel (D-N.Y.), said. He repeatedly questioned witnesses about whether the tax credit has benefited the American economy, whether it has been properly targeted to innovative, high-technology research and whether the credit should exist at all for industries that conduct R&D as a regular part of their business.

Congress' General Accounting Office (GAO) reported that the tax credit will reduce federal revenues by roughly $7 billion under current law. Johnny C. Finch, the GAO spokesman, said preliminary statistics collected since the credit was enacted in 1981 provide conflicting evidence about the effectiveness of the credit, so he suggested it not be made permanent.

Edwin Mansfield, an economics professor at the University of Pennsylvania, said his studies show that the tax credit increased the R&D expenditures of 11 industries less than 2% a year. For 1983, he said, the R&D induced by the credit amounted to about $638 million, while the tax credit reduced U.S. Treasury revenues by an estimated $1 billion.

Consequently, Mansfield endorsed the Reagan administration's position on the matter, which is to extend the R&D credit for three years to further study its effectiveness, rather than make the credit permanent.

Ronald A. Pearlman, tax policy chief for the Treasury Department, also urged Congress to revise the definition of qualifying R&D expenditures to ensure that only innovative technology research is rewarded with the tax credit. He said the administration does not support permanent extension because there is inadequate data and limited experience with the credit.

Rudolph G. Penner, director of the Congressional Budget Office, told the subcommittee that the R&D credit has complicated the federal tax code and become just one of many special tax breaks afforded large corporations. "In 1981, half of all corporations had no tax liabilities," Penner said. "We have reached the point that our tax system is asked to do so much that it does nothing very well. That includes its fundamental purpose — raising revenues."

Attempting to counter the skepticism, the Electronic Industries Association (EIA) argued forcefully for a permanent extension. Testimony by EIA President Peter F. McCloskey said a permanent R&D credit would help U.S. firms compete in world trade, reduce the U.S. trade deficit and provide firms with stability for R&D planning.

"If the credit is going to become an on-again, off-again proposition — every two or three years — the prospect of more R&D every year is diminished," he said.
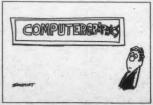
Likewise, Michael D. Rashkin, director of taxes for Apple Computer, Inc., testified in support of a permanent extension, asserting that "the greatest killer of the usefulness of a tax incentive is uncertainty."

John Young, president and chief executive officer of Hewlett-Packard Co. and spokesman for the Computer and Business Equipment Manufacturers Association, testified that a permanent R&D credit would help create new products, new jobs, more tax revenue, greater productivity and a higher standard of living.

The Lear Siegler, Inc., Instrument Division, Grand Rapids, Mich., reported that its R&D expenditures increased nearly 44% after enactment of the tax credit, and that it claimed the credit for such items as the award-winning Lear Siegler Flight Management Computer System used in Boeing Co. commercial aircraft.

Sen. Dennis DeConcini (D-Ariz.) testified that the credit is needed to help computer and electronics companies in his state that face tough foreign competition. DeConcini, who is author of a tax reform proposal that would eliminate virtually all tax credits, said the R&D credit should be extended until that major tax reform is accomplished.

COMPUTERGRAPHICS

COMPUTER INDUSTRY

Apollo looking to continue growth under new chief

By Kathleen Burton
CW West Coast Bureau

CHELMSFORD, Mass. — Apollo Computer, Inc., a manufacturer of stand-alone workstations for scientists and engineers, recently announced a top management reorganization said to be aimed at meeting high-growth goals in an increasingly crowded market niche.

Thomas A. Vanderslice, who resigned in December as president and chief executive officer of GTE Corp., will replace Apollo founder J. William Poduska Sr. as chief executive officer and Charles P. Spector as company president.

Poduska

Poduska will continue in his role as chairman of the board, focusing on long-range planning. Spector will assume new duties as vice-chairman of the board and will continue to run operations on a day-to-day basis. Vanderslice was responsible for GTE's domestic and international telephone, communications and electrical products operations; during his tenure, GTE's sales grew to over $12 billion.

Apollo, founded in 1980, manufactures Unix-based workstations. Since 1981, when the company lost $2.9 million on sales of $3.4 million, Apollo has forged a stunning business success. Second-quarter revenues were over $46 million, a 250% increase over the same period in 1983. Apollo's profits last year were $13 million, while revenues for that same period climbed to $80.7 million.

"With the addition of [Vanderslice]," Poduska said, "we are putting the infrastructure in place for our next phase of growth." Poduska said Apollo is aiming to exceed $1 billion in sales by 1986.

Neil H. Kleinman, general manager of International Data Corp.'s Pacific Technology Center, said "Apollo seems to recognize that to become a

Vanderslice

major player in the computer industry, they have to be a full service computer corporation. New competitors are forcing them to up the ante and position themselves to expand their product line into wider areas that will logically include both high- and low-performance processors. They are one of today's premier companies, and I would place them in the same fast-growth category that [Intel Corp.] once was."

Fred Cohen, an analyst at L.F. Rothschild, Unterberg Towbin in New York, said Poduska is easing out of Apollo's everyday operations to devote more time to his personal life.

COMPUTER INDUSTRY

Trilogy announces involvement in production of small processor

By Jeffry Beeler
CW West Coast Bureau

CARMEL, Calif. — Having already shelved plans to develop a large IBM-compatible mainframe, Trilogy Systems Corp. now intends to involve itself in producing a comparatively small processor instead, according to the company's founder, Gene Amdahl.

But exactly how the small machine will compare to existing computers in processing power remains a mystery.

Amdahl himself, however, discussed the machine's processing horsepower only obliquely. "I don't know yet exactly what level of performance the product will provide," he said recently during a symposium sponsored by California's San Jose State University and the Institute for Information Management.

A Trilogy insider, who requested anonymity, expects the proposed processor to incorporate Cmos technology and to be rated at about 10 million instructions per second (Mips).

Also shrouded in uncertainty is the question of whether Trilogy will bear the brunt of developing the small computer itself, or whether most of the work will be shouldered by one or more of its major business partners.

When Amdahl spoke of wanting to develop a small computer, "he [Amdahl] may not have been referring to Trilogy per se," according to Dr. Leilani Allen, the Institute's assistant general manager.

Amdahl's reference to Trilogy's interest in producing a small computer came during a July 26 session of a four-day symposium addressing the topic of "Information Economics for the CEO."

The company's proposed small computer will reportedly incorporate the same "wafer-scale technology" that Amdahl had originally intended to use in his aborted high-speed mainframe.

"Our current business plan calls for us to use that technology as best we can by adapting it to a smaller computer," Amdahl said.

Founded in 1980, Trilogy had originally planned to develop a fault-tolerant mainframe that would run IBM large systems software but would provide considerably more processing power than Big Blue's 3081. Estimates of the Trilogy machine's execution rate put it in the 32 Mips performance class.

But a long series of unforeseen technical and management hitches prevented the proposed mainframe from ever leaving the drawing board. Contrary to widespread opinion, the failure of Trilogy's development effort resulted not from one monolithic technical snag, but from a number of smaller problems that together proved fatal, Amdahl said privately following his symposium address. In fact, Amdahl characterized Trilogy's past product woes as "90% a problem of management rather than technology."

Whatever the source of its troubles, Trilogy eventually found itself unable to complete its mainframe development effort because it lacked sufficient research and development funds to make some fundamental but necessary design changes. So in June, Amdahl reluctantly announced his decision to scrap the company's plans to produce and sell a large-scale CPU.

At the same time, however, he also reaffirmed his intention to forge ahead with development of the corporation's wafer-scale technology and license it to other vendors for possible inclusion in their future mainframes.

Wafer-scale technology refers to a species of semiconductor logic in which chips are so large that each one occupies an entire silicon wafer. One of the purported advantages of Trilogy's technology over conventional logic circuitry is that it minimizes the number of interchip connections and thus greatly improves processing speeds.

IBM introduces more

IBM 3270 PC/G

If one picture is worth a thousand words, your Smart Desk can tell you volumes.

Especially when it's equipped with a new IBM 3270 Personal Computer/G or GX.

These 3270 PCs let you create charts, graphs, 3-D technical diagrams and other high-resolution graphics right in the office. Or you can view engineering designs created on other IBM graphics systems.

The graphics are created by downloading data from your company's mainframe computer or by running stand-alone. So, in either case, the host is free to go its way while you go yours. The results: faster response time and more cost-effective performance.

The 3270 PC/G's 14-inch screen displays up to 8 colors with 76 PELs per inch; the 3270 PC/GX's 19-inch screen, up to 16 colors with 93 PELs per inch.

An optional "mouse" makes for fast, easy creation of graphics. An optional writing tablet lets your sketches appear right on the screen. There are even panning and scaling features for enlarging important details.

And, because both of these new computers are IBM 3270 PCs, you get a lot more than just pretty pictures.

COMPUTER INDUSTRY

FAA to test IBM, Sperry air traffic control computer systems

WASHINGTON, D.C. — The Department of Transportation recently announced that two competing computer systems designed to handle increased air-traffic volume in the next decade will be tested at the Federal Aviation Administration (FAA) Technical Center near Atlantic City, N.J.

IBM and Sperry Corp.

have delivered their computer systems to the center, the department said. After tests during the next six months, one of the systems will be chosen to replace the computers in the nation's 20 air traffic control centers.

Since last September, IBM and Sperry have been competing under separate FAA contracts to design a system

that can run the same software used by the existing IBM 9020 computers, in use since the early 1970s.

According to the FAA, the new system must have the capacity and processing power to handle the traffic increases projected for aviation over the next decade. In fiscal year 1983, the 20 control centers handled more

than 29 million operations, and that total is expected to grow to more than 42 million by fiscal year 1995.

After IBM and Sperry have completed checks of their systems, they will begin a series of tests to demonstrate the capabilities of the two systems to FAA officials. These tests are expected to run until January 1985. In

October, the FAA plans to solicit bids for the system, enabling IBM and Sperry to submit proposals that include their test results.

The winning system will be selected in June 1985, with deliveries expected to begin in April 1986, the FAA said.

In a related effort, the FAA also said it will award competitive contracts for the design of the Advanced Automation System later this summer. That system includes new controller workstations (called sector suites), processors and software programs to increase automation in air-traffic control.

Comserv, CDC reach agreement

MINNEAPOLIS — Control Data Corp. and Comserv Corp. have reached an agreement in principal under which CDC will acquire a 20% interest in faltering Comserv, with an option to acquire an additional 20% share over the next five years.

The agreement came late last month as Comserv was on the brink of defaulting on an interest payment of $1.1 million on outstanding subordinate convertible debentures. The grace period on the loan was due to expire July 31. CDC loaned Comserv $2 million and, in exchange, received the right to buy 800,000 shares of new convertible preferred Comserv stock at a price of $3.5 million. The agreement is subject to approval by Comserv stockholders. A Comserv spokeswoman said the investors are expected to approve the transaction.

CDC also was granted an option to purchase another 20% of Comserv within four years, commencing one year after a definitive agreement has been reached. A CDC spokesman would not comment on whether the firm expects to pursue the option.

Comserv has been plagued by financial difficulties since 1982, when profits slipped to $1.6 million. The company reported an $11 million loss in 1983 and anticipates a $3 million loss in 1984, the spokeswoman said.

CDC has been interested in Comserv's manufacturing resource planning software to round out its computer-integrated manufacturing line of products, the CDC spokesman said. "This fits well into our plans," he said.

COMPUTER INDUSTRY

CDC buys Visi On rights

MINNEAPOLIS — Control Data Corp. recently purchased for an undisclosed sum the technical rights to Visicorp's Visi On system. CDC, in turn, will lease the retail marketing rights of Visi On to Visicorp.

CDC spokesman Alan Caminiti said the company's immediate plan for Visi On is to integrate the system into CDC's remote processing services.

The system and its applications packages will be marketed initially to large-account customers through CDC's Business Information Services business unit.

The Visi On development team will join CDC's Campbell, Calif.-based development group.

AT&T reveals joint chip venture in Spain

MADRID — AT&T said late-last month that it had reached an agreement here with the Compania Telefonica Nacional de Espana (CTNE) to form a joint-venture company that will manufacture integrated circuits at a $200 million plant in Spain.

The joint venture company will be 80% owned by AT&T and 20% owned by CTNE, Spain's national telephone company. The plant will have the capability to design and manufacture Cmos products.

The facility will serve Spain's custom integrated-circuit market and will provide access to markets in Europe and other international markets. Construction is scheduled to begin in 1985, with production starting in 1987, a spokeswoman said.

The project is expected to create about 700 jobs for Spanish citizens, who will be trained at sites in the U.S. and Spain.

The Spanish government has awarded a grant that will go to pay for a large part of the cost of the plant.

SCIENCE/SCOPE

National Semi, DLA end dispute

WASHINGTON, D.C. — The U.S. Defense Logistics Agency (DLA) last week said it has reached a final settlement with National Semiconductor Corp. in a case involving the company's failure to test adequately silicon chips supplied to the U.S. government from 1978 to 1981.

In a settlement announced August 7, the DLA said it would drop its previously announced debarment proceedings against National Semi, an action that would have banned the company from contracting with any agency of the federal government. A major reason for the government's debarment action stemmed from National Semi's refusal to identify the corporate officers and employees responsible for the fraud. That issue was resolved, National Semi said in a statement, when the company "agreed on a procedure by which employees could voluntarily describe their own responsibility to DLA under a court order assuring confidentiality."

A DLA spokesman said National Semi also agreed to four steps to prevent recurrences in chip testing fraud. These included the creation of an internal audit group to monitor the Military-Aerospace Products Group and the reassignment of several managers within that group, creation of a company policy requiring the dismissal of employees who fail to comply with government rules and installation of a confidential hot line for employees to report company fraud or abuse.

The company also will pay $373,200 to cover expenses incurred by the government as a result of the case.

As reported, National Semi pleaded guilty in March to a 40-count federal indictment that it inadequately tested chips sold to the government. The company paid $1.75 million in fines and penalties at that time [CW, March 12].

At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

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The Kodak KAR-4000 information system. It gives the computer a photographic memory.

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COMPUTER INDUSTRY

Eagle co-founder resigns to head own firm

By Kathleen Burton
CW West Coast Bureau

LOS GATOS, Calif. — Charles Kappenman, co-founder of financially troubled microcomputer manufacturer Eagle Computer, Inc., recently resigned his position as chairman of Eagle to devote his full-time efforts to his new company, Audio Visual Laboratories in New Jersey.

Ronald N. Mickwee, Eagle's president and chief executive officer, will replace Kappenman as chairman, and Gerard Kappenman, another Eagle founder and former company officer, will replace his brother Charles on the board.

Eagle has been battling financial setbacks for several months. In June, the firm was unable to meet a scheduled repayment plan to several major suppliers. Frank Weikel, Eagle's director of corporate communications, said recently that Eagle's credit committee has approved a plan to restructure the company's $9 million unsecured debt, and the company's creditors are presently reviewing the proposed plan.

Mickwee said the company has also appointed Sam Goodman as its executive vice-president and chief financial officer.

Goodman is the first executive hired since the resignations in June of six vice-presidents and three directors.

Mickwee said that Goodman, formerly the president and chief executive officer of Nutritional Foods, Inc. of San Francisco, has "a reputation for helping companies achieve profitability" and that his appointment will free Mickwee to redirect Eagle's long-range marketing strategy.

Goodman was quoted in a company press release as saying he was "intrigued by the prospect of trying to save Eagle, although it may take a year to accomplish a change in direction and a return to profitability."

Goodman was chief financial officer at Ampex Corp. during its turnaround in 1974, and, following that assignment, he helped revitalize a $300 million division of the W.R. Grace Corp.

Mad registers monopoly suit against Apple

By Kathleen Burton
CW West Coast Bureau

SANTA CLARA, Calif. — Mad Computer, Inc., a personal computer manufacturer based here, recently filed a federal court suit alleging that Apple Computer, Inc. conspired to monopolize the microcomputer market, stifle competition and thwart Mad's plans for growth.

The suit alleges that several Apple defendants, including Apple Chairman Steve Jobs and former Apple Executive Vice-President E. Floyd Kvamme, took part in secret meetings at locations in Saudi Arabia, Las Vegas and northern California between November 1982 and January 1983 aimed at discrediting Mad and avoiding potential competition.

The suit also alleges that Apple threatened Mad employees and suppliers, delayed production and sales of the MAD-1 computer and obtained and disclosed Mad's confidential business plan to outsiders.

Mad is seeking $1 million in damages from Apple.

It also claims that the alleged injuries sustained are valued in excess of $10 million, an amount that could triple if the suit is settled in Mad's favor.

The dispute dates back to January 1983, when Apple terminated a distribution agreement in the Middle East with Multi-Media Video, Inc. (MMV), a Saudi Arabian distribution firm founded by John Nafeh, who subsequently left MMV to found Mad Computer in 1982. Nafeh and his company went on to develop the Mad-1 computer, an IBM-compatible machine.

Mad's complaint alleges that Apple terminated the MMV distributorship early in 1983 to cripple Mad as an Apple competitor, since Apple believed that "the development of Mad was dependent on and funded by" MMV's distribution revenues. Shortly after the termination, MMV sued Apple for terminating the contract; and the case has been heating up ever since.

The Mad suit also alleges that an earlier lawsuit, filed by Apple in California's Superior Court and based on the alleged theft by Mad of Apple's trade secrets, was a "sham lawsuit," designed to discourage potential investors from doing business with Mad. The Apple suit accuses Mad of acquiring trade secrets by hiring six former Apple employees, including Vince Brannan, Apple's former vice-president of sales.

Nafeh claims he did not attempt to hide development of the Mad computer from Apple and that the design of the MAD-1 was intended to be used with IBM-compatible software, not Apple-compatible software.

Apple's legal department would only say the matter is heading toward trial.

COMPUTER INDUSTRY

Automatix sells 10% interest to GM

BILLERICA, Mass. — Automatix, Inc. announced recently it had reached an agreement to sell a 10% equity interest in the company to General Motors Corp., which also invested in two other machine vision companies.

GM agreed to pay Automatix here $10 per share, about $12 million, for the initial equity interest and will also receive warrants to purchase an additional 10% of Automatix shares. GM agreed to limit its ownership of Automatix to 20% for the next three years.

It was also announced GM will acquire up to 20% of the shares in View Engineering, a privately held firm based in Simi Valley, Calif., and a 15% equity interest in Diffracto Ltd., a privately held Canadian firm based in Windsor, Ont.

The investments were announced less than one month after GM announced it would acquire Electronic Data Systems Corp. of Dallas for an estimated $2.5 billion.

The Automatix agreement calls for GM to fund near-term development of existing Automatix machine intelligence applications, primarily in vision, and also to fund research and development of advanced vision and machine intelligence systems for specific GM target application areas. After an initial period, all such funded developments will be exclusively licensed, under a royalty arrangement, to Automatix for manufacture and sale outside GM.

Philippe Villers, chairman and founder of Automatix, said the arrangement "is a means of quickly channeling the world's most advanced adaptive automation to the factory floor. ... For Automatix it provides a means of funding the extensive research and development efforts required in computerized robotics and vision." Prior to the agreement, Automatix reportedly derived about 30% of its revenues from sales to GM.

The day after the investments were announced, Automatix reported a second-quarter loss of $3.1 million, or 26 cents per share, compared with a year-earlier loss of $343,000, or 3 cents per share. The company reported revenues of $4.4 million, compared with $2.3 million a year earlier. Automatix suffered a first-quarter loss after changing accounting policies for European sales.

Contel buys Execucom
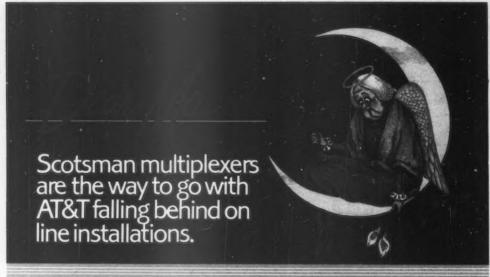
AUSTIN, Texas — Continental Telecom, Inc. (Contel) recently announced completion of the acquisition of Execucom Systems Corp., a supplier of decision support software, based here.

In late July, Execucom shareholders approved the agreement under which Contel acquired Execucom in exchange for Contel common stock, valued at $18 million.

Execucom became part of Contel's Information Services Group, reporting through STSC, Inc., another member of the Contel group.

The principal products of Execucom are the Interactive Financial Planning System (IFPS) and IFPS/Personal, two decision support software products.

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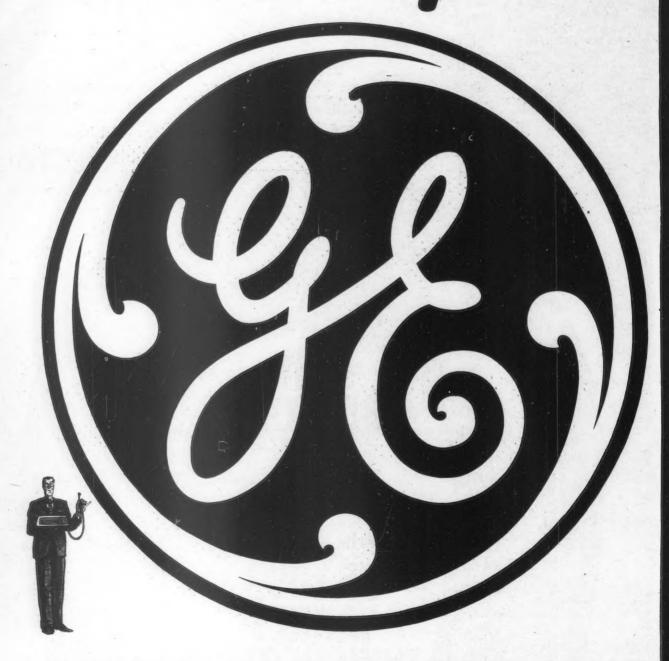
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COMPUTER INDUSTRY

SUPERSHORTS

MAI/Sorbus Service, a third-party computer maintenance organization, will expand its software sales program by increasing the number of its local retail outlets.

■

Icot Corp. announced that **NCR Corp.'s** third-party maintenance organization has been selected to provide full maintenance services for Icot on a worldwide basis.

■

The shareholders of **Quality Micro Systems, Inc.** approved a proposal changing the company's name to **QMS, Inc.**

■

In a move to consolidate its impact printer and typewriter businesses into one organization, **Xerox Corp.** announced that management responsibility for Diablo Systems, Inc. would transfer from the printing systems division in Fremont, Calif., to the information products division in Dallas.

■

Computer Corp. of America (CCA) and **Crowntek, Inc.** have announced the formation of **Crowntek International Ltd.** to market and support CCA's Model 204 data base management system software products in the UK. This new presence in the UK is viewed as being the first step toward establishing directly owned distribution channels to promote CCA products throughout Europe.

■

Mostek Corp. announced the formal opening of its new semicustom design center, located at its headquarters and main manufacturing site. The center offers convenient and comprehensive comput-

er-aided design tools to let designers quickly implement their logic and system designs in silicon, the firm said.

■

Innovatech Corp. announced the company has established a wholly owned subsidiary called **Innovatech Systems, Inc.** to develop integrated computer systems for automating retail business operations.

■

Recognition Equipment, Inc. announced the forma-

tion of its financial systems division and named John Chenault general manager. The new division will be responsible for engineering, marketing and production planning for the company's Trace II document processors and its Keyscan remittance processor.

■

Planning Research Corp. has been awarded a contract with an expected value of $7.1 million to continue providing the Executive Office

of the President with office automation services and data processing support. The basic $550,000 contract extends only through September, so its subsequent option periods will correspond with the federal government's fiscal years. The contract contains three one-year renewal options, each valued at more than $2.1 million.

■

VLSI Technology, Inc. and **Western Digital Corp.** jointly announced that a let-

ter-of-intent agreement has been signed. The long-term agreement will feature new product codefinition and co-development, immediate second sourcing of specific products and certain product conversion from Nmos to Cmos technology.

■

Tandon Corp.'s systems division has moved its entire operations and work force from Simi Valley, Calif., to the company's plant in Thousand Oaks, Calif.

Printronix settles suit

IRVINE, Calif. — Printronix, Inc. said last month that it has settled its patent litigation suit against Mannesmann Tally Corp.

Under terms of the agreement, Mannesmann Tally will be allowed to continue manufacturing and marketing its M630, M660 and M690 printers, Printronix said in a statement. Mannesmann Tally will pay Printronix an undisclosed sum of money for each printer sold and has granted Printronix a license to certain of its patents.

Mannesmann Tally did not admit to an infringement of Printronix patents or recognize the validity of those patents, the statement said.

A LONG, DRAWN EXPLANATION OF THE DCA

COMPUTER INDUSTRY

IBM from page 107

The announced compromise, in McAdams' view (see related story on page 107), may serve to relieve the psychological fear of large-system users who now have the comfort of IBM's stated intent to provide other vendors with information necessary to develop peripheral products that would be plug-compatible with IBM processors. But for U.S. mainframe vendors who are not plug-compatible, it is likely to mean an IBM systems approach is more attractive to users who can depend on better products at lower prices from plug-compatible manufacturers.

McAdams expressed bitterness that in 1982 the Justice Department said the U.S. antitrust action had been without merit. McAdams claimed that IBM, at one point during the course of the proceedings, had offered a compromise settlement to divest a large portion of its small systems business, valued at about $2 billion.

"IBM clearly expected to lose [the U.S. antitrust action]," he said. "IBM restructured itself to permit the largest divestiture in history to that point." The compromise attempt died when the Justice Department insisted upon three separate companies being formed from IBM's existing businesses, rather than two separate companies, as IBM had offered.

IBM declined to comment on McAdams' claim about the compromise attempt.

During the course of the trial, McAdams himself became the center of controversy when he was accused of coaching government witnesses in preparation for their courtroom testimony. The mention of his name to this day prompts scorn from IBM executives.

McAdams said the failure of the U.S. action was largely a result of the continuing "turnover in the hierarchy" at the Justice Department during the course of the lengthy proceedings. "I served under seven antitrust [division] chiefs," he noted.

He still believes IBM has a negative impact on the information systems marketplace. "As far as monopoly power, [IBM has] got it; they've had it; and they've demonstrated it again" with the EEC compromise, he said.

IBM's reported threats to pull out of the European market rather than disclose technical information "had everyone quaking" because of IBM's large market share in Europe.

Perverse market

Calling the present large-scale systems market perverse, McAdams claimed that as a result of IBM's marketing power, "new technology outside of IBM that would permit a number of firms producing products of better quality [than IBM products] has been severely retarded."

While the U.S. government's case apparently floundered on trying to prove the distinction that IBM misused monopolistic power, McAdams said, "the crucial thing about a monopolist is that it is often able to do things based on power rather than based on quality." IBM is able to scare away competition through litigation, he added. "IBM is misusing the power of litigation; it is using it offensively rather than defensively."
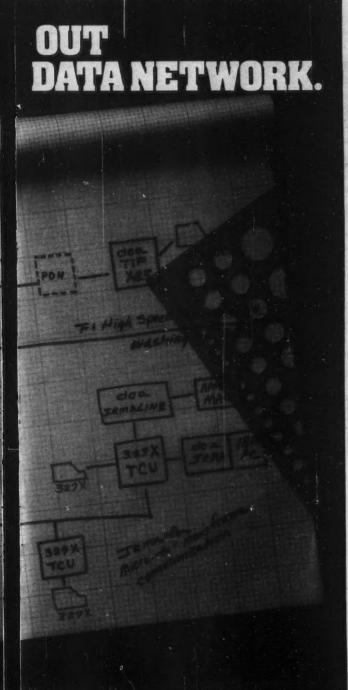
He said IBM's success with its Personal Computer product was an example of IBM "taking over markets because of power, not quality." IBM, according to McAdams, produced a mediocre personal computer product, but because of the IBM stature, other vendors developed a number of products to make the Personal Computer better.

Apple an innovator

"I don't think IBM, in the [Personal Computer] case, needed to abuse power," he said. He said Apple Computer, Inc. was an innovator with its Macintosh product, but because of the "distortion to the market" caused by IBM's power, Apple is suffering because it is not compatible with IBM products.

"I don't think this is the right kind of incentive to have in an economic system," he commented. "The payoff should come from quality."

He noted that the Japanese, often cited by IBM as the beneficiaries of any disclosure requirements, have a number of companies competing on an essentially even basis. "The strength of the Japanese is their internal competition. ... Why does IBM have to be 10 times larger than anybody else to compete?" he said.

COMPUTER INDUSTRY

NICKELS AND DIMES

MSI Data Corp. announced profits for its first fiscal quarter ended June 30 of $249,000, or 10 cents per share, compared with $868,000, or 35 cents per share, for the like period the previous year. Revenues were $13.7 million, compared with $14.1 million for the comparable period the previous year.

Intecom, Inc. announced second-quarter revenues for the period ending June 30 of $28.2 million, an increase of 53.2% over the $18.4 million reported in the second quarter of last year. Profits were $1.7 million, or 6 cents per share, compared

with $1.5 million, or 5 cents per share, last year.

Computer Consoles, Inc. reported profits for the second quarter ended June 30 of $2.8 million, or 23 cents per share, compared with $2.7 million, or 23 cents per share, in the like period one year ago. Revenues were $36.1 million, compared with $23.6 million one year earlier.

Continental Telecom, Inc. reported revenues for the quarter ended June 30 of $567.4 million, compared with $528.6 million for the same period last year. Profits were $46.6 million, or 65 cents per share, compared with $42.2 million, or 60 cents per share, for the like period one year earlier.

Reynolds & Reynolds Co. an-

nounced profits for the third quarter ended June 30 of $4.4 million, or 94 cents per share, compared with $3.5 million, or 75 cents per share, in the comparable period last year. Revenues were $74.2 million, compared with $64.1 million one year earlier.

Systematics, Inc. reported revenues for the year of $78.7 million, compared with $64.3 million for the previous year. Profits were $6 million, or 56 cents per share, compared with $4.6 million, or 45 cents per share, last year.

Daisy Systems Corp. announced revenues for the third fiscal quarter of $18.5 million, a 262% increase over last year's $5.1 million. Profits were $2.8 million, or 19 cents per share, compared with $669,000, or 5 cents per share, last year.

Applied Data Research, Inc. announced revenues for the three-month period ended June 30 of $28.5 million, compared with $16.7 million one year earlier. Profits were $1.6 million, or 32 cents per share, compared with a loss of $835,000, or 18 cents per share, one year ago.

Miniscribe Corp. reported that revenues for the second quarter of 1984 totaled $35.4 million, an increase of 142% from the $14.6 million reported for the corresponding period a year ago. Profits were $2.3 million, a 156% improvement over the $917,000 reported for the earlier period. Second-quarter earnings per share were 12 cents, compared with 5 cents in the second quarter a year ago, prior to the initial public offer-

EEC

fact release interface specifications. Now they will. This will have a worldwide effect."

As to speculation that IBM would simply delay its product announcements until four months prior to its ability to deliver a product, Whitcomb expressed little concern. "They can do that, but in the large-processor market that is a very short period of time. . . . Customers have to have time to plan," he said.

Whitcomb said the agreement will "relieve the FUD factor — fear, uncertainty and doubt — among users."

Dr. Alan F. McAdams, a Cornell University economist and a key member of the U.S. Justice Department's trial team in the U.S. antitrust case, said of the EEC compromise: "Something is better than nothing. The major impact is likely to derive from the psychological factor."

McAdams said users of large systems will no longer fear that IBM might make it impossible to attach plug-compatible equipment to IBM processors. But, he added, that may not be good news for manufacturers of non-IBM-compatible equipment. The compromise may serve to encourage more users to adopt IBM-oriented systems, based on the knowledge that plug-compatible manufacturers will always be able to spur technological and price improvements.

However, McAdams said he doubts IBM will abide by the spirit of the agreement. While IBM has accepted jurisdiction of a "non-IBM-controlled forum," he said, in past instances in the U.S. where it had agreed to moderate its actions, "IBM subverted such agreements."

Industry observer Robert Djurdjevic, editor of the "Annex Computer Report" newsletter, said the significance of the EEC compromise is that, "For the first time, IBM has recognized somebody else's jurisdiction over its conduct." The agreement, Djurdjevic said, is an indication IBM is "beginning to pull in its horns a bit." Furthermore, he added, it indicates the checks and balances of the marketplace are starting to work.

IBM's official view was stated by company Chairman John R. Opel, who said: "This undertaking [by IBM] satisfies the commission's desires and puts the matter behind us without requiring us to make significant changes in how we do business."

Whether the agreement is substantive or symbolic, only time will tell.

DIMES from page 124

ing of the company's common stock.

Computer Task Group, Inc. reported revenues for the second quarter of $18.6 million, compared with $13 million in the comparable period one year ago. Profits were $511,000, compared with $372,000 one year ago.

Ungermann-Bass, Inc. announced that revenues for

the second quarter were $12.6 million, up 133% from the comparable period one year ago. Profits were $1.4 million, or 9 cents per share, compared with a loss of $88,000, or 1 cent per share, in the similar 1983 period.

Hogan Systems, Inc. reported a net loss of $1.5 million, or 11 cents per share, on revenues of $6.7 million for its first fiscal quarter ended June 30. In the comparable period one year earlier, the

company reported revenues of $4.2 million and no profit or loss.

Telex Corp. announced revenues for the first quarter of the fiscal year of $97.1 million, an increase of 37% over the $70.7 million for the comparable period last year. Profits were $10.7 million, or 74 cents per share, compared with $8 million, or 56 cents per share, one year ago. The recently announced acquisition of Raytheon Data Sys-

tems Co. operations, effective July 1, should add about $50 million per quarter to revenues.

Endata, Inc. announced revenues for the second quarter of $12.3 million, compared with $8.3 million one year ago. Profits were $581,000, or 14 cents per share, compared with $480,000, or 14 cents per share, reported in the comparable period of the previous year.

IWAI from page 107

Fujitsu's eventual goal is to have each of its subsidiaries operate as an independent division "completely run by American staff as a local American company," Iwai said. To demonstrate its commitment to the U.S. market, Fujitsu has set up a semiconductor manufacturing plant in California and a fiber-optic cable manufacturing facility in Texas.

Iwai said the company has a policy of manufacturing locally "whenever possible. If everything is manufactured in Japan and sold on an OEM basis in the U.S., then eventually the volume will get so high that employment will drop in the U.S.," he reasoned.

There is no best strategy for a Japanese firm to enter the U.S. market; it depends on the product, Iwai said. The OEM route is probably best for makers of large-system components, he added, while low-end products can best be sold by making use of an existing American distribution channel.

"We believe that if a Japanese enterprise can supply system components on an OEM basis to the U.S. industries, in good quality and at low cost, it will assist U.S. industries to prosper," Iwai said.

Not surprisingly, Iwai shed little light on whether Fujitsu and Amdahl are nearing an agreement on the latter's marketing of Fujitsu's supercomputers in the U.S. Negotiations between the two companies have reportedly been taking place for nearly a year.

"At this point, Amdahl is just one of the possible sales channels to sell supercomputers to the U.S.," Iwai said. He was noncommittal when asked if Fujitsu could penetrate the military and scientific markets dominated by supercomputer makers Cray Research, Inc. and Control Data Corp., saying only that Fujitsu will be happy if its supercomputers are used for noncommercial applications.

About its financial stake in Amdahl, Iwai asserted that, contrary to some press accounts, Fujitsu did not make an aggressive purchase in order to take control of Amdahl. "Generally speaking, there should be no changes in Amdahl's organization and way of management," Iwai said.

He said he has been told that Amdahl employees are pleased with Fujitsu's ownership. "We believe this type of morale improvement could influence Amdahl's marketing business," he said. "Fujitsu hopes this will provide Amdahl employees with more energy in doing their [jobs] because they no longer need to worry about a liability."

POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS

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Your name, resume, and present employer will not be given out without your permission.
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PULLMAN PERSONNEL
3033 North Central Ave., Suite 505, Phoenix, Arizona 85012

Free planning guide to help you advance and earn more during the crucial first six years of your career

With so many changes in technology and computing, will your current skills be sought after in the future? Are you aware of all your career options? What are you doing to make sure your career won't become stagnant or falter? And, more importantly, is your career keeping pace with today's opportunities?

The Crucial Early Years provides information on techniques that you can use to assess the quality and value of your current experience, how to gain full awareness of all your career options and how you can capitalize on this information. You'll also learn:

• How to accelerate your career and earnings by as much as 100% in the next few years

• How to solidify and strengthen your background each time you advance in your career

• When you should—and shouldn't—make a career move

• The significance of the "80/20 Rule" and how to use it to your advantage

You owe it to your career to call Source Edp and request a copy of this valuable report. Effective planning is especially important during the first two to six years of your career, and **The Crucial Early Years** can help you establish a solid foundation that will help assure your long-term development. There is absolutely no cost or obligation in exchange for this free report—or for any of our services; career planning, counseling or placement. Simply call your nearest Source Edp office today.

Call today

Call the Source Edp office nearest you for a free copy of **The Crucial Early Years**. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

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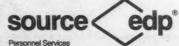
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Support Sets Us Apart

Cullinet's dedication to customer satisfaction has made us the most successful and respected name in software products. We take the best technical professionals and put them where the action is: Interacting with our customers to help them get the most out of Cullinet's advanced software solutions. It's support like this that insures the continued growth and success of Cullinet,...and your career.

Applications Support

In-House Customer Support Reps

Human Resources Applications — We're looking for highly qualified support professionals with excellent problem-solving and analytical skills to work with Cullinet customers in telephone support of our Human Resources Applications software products. To qualify, your background should include 3 or more years in data processing as an applications programmer, with at least one year in personnel and/or payroll applications, working directly with end-users. You should have excellent interpersonal skills, and be familiar with on-line systems, preferably CICS or IDMS/DC, and database applications (IDMS or IMS).

Manufacturing Applications Support

We have several openings for highly-talented support professionals with on-line systems familiarity, to handle a variety of support roles concerning our Manufacturing Applications software products. To qualify, you must have 3 or more years' applications support experience, preferably in an IMS, IDMS environment.

Marketing Support And Customer Support

- **Financial Applications Software**
- **Manufacturing Applications Software**
- **Database Software**

We have a number of challenging openings for highly talented support professionals in the above areas of data processing expertise. To qualify, you must have 3-5 years of data processing experience in an IBM mainframe environment.

For the Customer Support positions an in-depth knowledge of database and/or the above applications areas from an installation or systems analysis viewpoint is required. Good communications skills and an understanding of the user environment are a plus.

The above opportunities are available in Boston, NYC, Chicago, Philadelphia, Toronto, and other major cities throughout the U.S. and Canada.

Technical Support

Technical Support Representatives

We seek innovative problem-solvers with excellent interpersonal and communications skills, and a minimum of 3-5 years of directly related experience in an IBM environment to be involved in a variety of Technical Support roles. IBM Assembler language skills are essential. Experience with database systems, and MVS/DOS/VM systems programming is highly desirable. We currently have openings for professionals who would like to work with Cullinet customers in the following functions:

- Installation Support for our customer base and technical staff. Experience in Systems Programming and knowledge of VM, DOS, and VSE is essential.
- Data Dictionary Support. Database management experience and strong Assembler language skills required.
- IDMS/R Support. Database management experience and Assembler language skills required.
- IMS DC Support. Strong Assembler language skills and database experience are desirable. Requires in-depth background in internals with TP or CICS, IDMS/DC or other monitor.
- Interact Support. Strong Assembler language background. MVS Systems programming experience desirable.
- ADS/O Support. Strong Assembler language background. Knowledge of data base management desirable.
- Culprit Support. Strong Assembler language background. Knowledge of database management desirable. Operating Systems experience required.

In addition to the openings in our Corporate Facility in Westwood, we are looking for Technical Support Reps for Chicago, Atlanta, Los Angeles and Philadelphia. Support Reps based in Philadelphia must be fluent in the French language.

Development

Applications Software Development

Challenging opportunities to develop a fully integrated set of human resource, manufacturing and financial products in an on-line database environment. Requires a minimum of 2 years' applications development experience; database and on-line background desirable.

- **Human Resource Systems**

  Contribute to the design and development of payroll and personnel as well as associated human resources modules using IDMS and ADS on-line.

- **Financial Systems**

  Participate in the development of general ledger, accounts payable, accounts receivable, purchasing, and order entry; all integrated in an IDMS DB/DC environment.

- **Manufacturing Systems**

  Development of bill of material, cost control, inventory control and master production scheduling. Fully integrated with the financial systems.

Software Technical Writers

Working closely with development, editorial, and publication staffs, you'll design and write user and system documentation for database and applications software.

To succeed, you should possess a minimum of 1-2 years' software technical writing experience. The ability to work independently on a variety of projects and good organizational skills are essential.

- **Human Resource/Payroll Applications**

  Requires familiarity with payroll or personnel functions and experience with payroll or personnel application software.

- **Financial Applications**

  Requires an understanding of accounting and experience with general ledger, accounts payable, or accounts receivable application software.

- **Manufacturing Applications**

  Familiarity with manufacturing concepts such as MRP and MPS, or experience with manufacturing applications software required.

- **Database Systems**

  Requires a solid understanding of database concepts.

Sales Training

Manager/Sales Training

In this exciting ground floor opportunity, you will utilize your excellent communications and presentation skills, as well as creativity, to assist the Director of Training in building a superior department while you develop a multi-level Sales and Sales Management training program. To qualify, you must have 5-10 years of experience in Sales/Sales Training, plus an in-depth understanding of the concepts and functions of both software and hardware in the IBM mainframe (plug compatible) environment.

Sales Trainer

Here's the ideal opportunity for a Technical Sales Support or Systems Engineering Professional to get involved in training. In this unique, start-up training situation, you will develop course materials and deliver programs to advance the skills of our sales force. To qualify, you must have 5+ years of sales or marketing-oriented Systems Engineering experience in an IBM mainframe (plug compatible) environment. Good presentation and communications skills are essential.

The above opportunities are available in our Corporate facility located in Westwood, Massachusetts.

Interested candidates please reply with resume and salary history to the appropriate contact listed below, at:

Cullinet Software, Inc.
400 Blue Hill Drive
Westwood, MA 02090

Technical Support, Development and Applications Support — Frank Emro

Sales Training, Marketing Support and Customer Support — Roy Evarts.

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Everything you want in the career future you expect!

Perkin-Elmer made computer history in 1974 when our 32-bit mini was introduced. It was the first mini designed to handle "maxi" tasks, and was a major advance in data processing capabilities.

And this was just a prelude to technological advances to come. We followed one breakthrough with another, and called it EVERYWARE™— a comprehensive line of computer hardware and software. EVERYWARE™ furthers the famous Perkin-Elmer tradition of superior design and unparalleled quality.

We are excited about today's possibilities for our advanced systems, but even more enthusiastic about what the future holds. Our strong position in the mini-computer market, with an installed base of over 5,000 units, is expanding at a phenomenal rate.

Perkin-Elmer continues to be a "company on the move", as we introduce new products and penetrate new markets — creating exceptional opportunities for career advancement in Mini-Computer Sales and Support.

Move up from a mini- to a macro- career future with an industry leader in one of the following positions:

SYSTEMS ANALYSTS

Because we're selling total systems solutions, not merely computers, our systems analysts act as consultants from the start of the sales effort. Working closely with our sales representatives you will have a broad product line available to meet clients' needs — from supermini's to our new workstations.

Qualifications should include a technical degree and 3-8 years of systems analyst experience in 2 or more of the following areas: operating systems (UNIX™), knowledge of hardware configurations, data communications (i.e., SNA, LAN and X.25), data management systems, scientific languages, and real-time computer operations (i.e., flight simulation).

SALES REPRESENTATIVES

You must have a minimum of 3 years technical experience selling mini-computers. Excellent communications skills, knowledge of UNIX™ and FORTRAN, technical competence in hardware, and proven ability to develop new accounts are essential prerequisites. BS degree in a technical field or its equivalent is preferred. Salary, commission, bonus plan, and car allowance comprise the remuneration.

A future with Perkin-Elmer is a future full of career satisfaction, opportunities for advancement, and the rewards of performing well for a company quick to recognize talented individuals. Enlarge your expectations to include a macro-career, today, by sending your resume and salary history to: A. Borkin, The Perkin-Elmer Corporation, Data Systems Group, 2 Crescent Place, Oceanport, NJ 07757. No phone calls please.

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Programmer/ Analysts

Be at the center of next generation computing...at NCR

NCR Engineering and Manufacturing–Columbia is forging ahead in microcomputer small business systems design and development. We conceived, developed and manufacture the UNIX*-based Tower 1632, a breakthrough in new-generation systems capability. The Tower's only seven inches wide, yet is packed with state-of-the-art technology including a Motorola 68000 processor and a Multibus peripheral interface, with industry-standard hardware components.

Be part of our success story in one of the following areas of advanced development. All positions require either a BSCS or BSEE.

APPLICATIONS PROGRAMMERS--
To specify, evaluate and port industry standard applications packages. Requires solid experience and UNIX/C knowledge.

SYSTEM INTEGRATION AND TEST ANALYSTS--
To test and integrate UNIX systems and to isolate and repair SW modules. Requires UNIX/C knowledge and familiarity with source code control and SW test techniques.

PRODUCT SUPPORT ANALYSTS--
To document and coordinate field tests and to identify/solve customer hardware and software problems. Requires UNIX/C knowledge.

FIRMWARE DEVELOPERS--
To develop firmware for processor modules and device controllers. Requires M68000 assembler and C knowledge as well as experience with diagnostics. Familiarity with UNIX preferred.

Explore your excellent career prospects with the dynamic $3.7 billion NCR Corporation. Send confidential resume with salary history, indicating position of interest, to: Gordon Davidson, Personnel Resources, NCR Corporation, Dept. U56, 3325 Platt Springs Road, West Columbia, SC 29169

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Enter the aggressive stance and planned growth of Florida's most dynamic banking organization. Enter the technical challenges and Sunbank Service Corporation's state-of-the-art environment. List opportunities for advancement because Sunbank is a wholly-owned subsidiary of Sun Bank, Inc., one of the fastest-growing bank holding companies in the Southeast with assets over $9.1 billion. List 260+ banking offices throughout Florida linked by a Branch Automation System, a highly sophisticated Information Center, and one of the largest ATM networks in the nation.

Assign values to a competitive salary, generous benefits, relocation assistance, encouragement to achieve and grow. If you can capitalize on one of the opportunities below, you can program an outstanding career for yourself with Sunbank.

CAPACITY and PERFORMANCE ANALYSTS

You should have 2 to 3 years of performance tuning experience in MVS or IMS, including running software monitors, and the ability to work with all levels of management. Experience in IMS/PARS, VTAM/PARS, and BEST/1 with a knowledge of IMS and VTAM is preferred.

Positions are also available for applications programmers with experience in financial applications.

Discover the advantages of Florida living with unlimited recreational opportunities and no state income tax. If you'd like to combine a programming career with our easy Orlando lifestyle, please send your resume in confidence to: Sunbank Service Corporation, Technical Recruiter, Dept. CW, 2290 Premier Row, Orlando, FL 32809.

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Sun Bank

At M/A-COM DCC, We're Looking Forward to Our Future...

Because of the nature of the telecommunications industry, the innovations that made us a world leader have to be improved upon daily. And at M/A-COM DCC, they are. A part of M/A-COM, Inc., a Fortune 500 company, we're at the cutting edge in the industry, designing, developing, and manufacturing data and satellite communications products.

We look forward to the telecommunications future and the advancements that we will make. And we are currently seeking the professionals who will help us make them. We have immediate career opportunities available for the following technical professionals:

SENIOR SOFTWARE ENGINEERS

Two areas of application are available for talented software professionals. In one area, you will design and develop software for digital communications systems. You will work on advanced Intel microprocessors, and have responsibility for design and implementation for the control of speech interpolation equipment. You must have a BS degree in Computer Science with at least 4 years of experience in microprocessor software development using high-level languages.

Duties for the other position will include leading a software effort for ongoing maintenance, support, and enhancement for a large-scale, in-place network. This position requires 2-5 years experience with Data General 16 bit minicomputers, RDOS operating system, DCU coding, or Z-80.

SECTION MANAGERS

We are seeking two Section Managers to join us. Responsibilities for the first position include providing technical and administrative leadership for software support on various data communications projects. The ideal candidate will have a BS degree and 6-10 years experience on mini and microcomputers, preferably DEC, VAX 11/780, and Intel 8086/80186/80286.

Another position is available for a manager to direct efforts and work on maintenance and enhancement for all software operations and product support lines. A BS in Computer Science or related degree and at least 5 years experience in real-time system development and support is required. Experience with Intel 8086, PLM, and Pascal helpful.

...and Yours.

M/A-COM DCC offers top salaries, excellent company-paid benefits, unlimited state-of-the-art challenges and an exceptional working environment. Additionally, our location is as attractive as our opportunities. We're positioned just outside of our nation's capital where you can be near mountain ski resorts and Atlantic Ocean beaches. You can also enjoy an evening at the Kennedy Center or visit all the major cities on the East Coast . . . all just minutes away.

The future of telecommunications begins at M/A-COM DCC. Yours can too. Look into one of our challenging career opportunities by sending your resume and salary history in complete confidence to:

SUSAN MORALES
Technical Recruiter
M/A-COM DCC, Inc.
11717 Exploration Lane
Germantown, MD 20874

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DATA BASE ANALYST

High tech mfr. seeks Sr. IMS DB/DC Analyst. Min. 7 yrs. exp. as a DB Analyst in a med. or lge. scale IBM installation. Act as proj. mgr. for the DBA on major projs. $39,000.

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Liverpool, N.Y. 13088.

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SENIOR PROGRAMMER
Monthly Salary Range $2543-3949 Tax Free*
Plus Free Housing

DUTIES

To develop and maintain computer programs for aircraft reliability and fleet statistics.

REQUIREMENTS
(For Both Positions)

Degree in computer related field and 3 years in design and development of real-time software system for engineering applications using Fortran and Assembler on mini computers. Experience on HP-1000 with RTE 6/VM operating system and HP-3000 with MPE operating system and IMAGE/DBMS-3000 will be preferred.

BENEFITS

Free furnished air-conditioned housing and utilities • Paid medical and group life insurance • 30 day vacation-travel time to and from domicile • Free or reduced rates on Saudia and other airlines • Retirement program (social insurance after 15 years service) • Additional household shipment from domicile to Saudi Arabia and back • K-9 schooling for children — out of Kingdom financial assistance for other grades • Annual service increase and eligibility for yearly merit bonus based on performance.

*Tax free status subject to normal qualifications. The indicated salaries have been converted from Saudi Riyals to U.S. dollars at the current rates of exchange, which are subject to fluctuation. Positions are offered on a two-year (renewable) contract.

Send resume to:

SAUDI ARABIAN AIRLINES
Administrative Recruiter, Dept. 2R-P
2420 Pershing Road, Suite 333
Kansas City, Mo. 64108

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NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY
OPPORTUNITIES FOR CHALLENGING POSITIONS IN
COMPUTER NETWORKING

COMPUTER SCIENTISTS, ANALYSTS, PROGRAMMERS, AI Experts, Compiler Writers, and Statisticians needed for the following Programs:

Protocol Design Program - to design and specify network protocols in conjunction with Government, industry, and national and international standards bodies.

Protocol Correctness Laboratory - to develop test procedures, protocol implementations, and conduct tests with Government and industry.

Protocol Performance Laboratory - to design and test improved protocol algorithms to enhance performance of emerging international standards.

Network & Protocol Measurement Laboratory - to develop protocol and network measurement methods used in instrumentation and modeling.

Protocol Methodology Program - to automate the design, specification, implementation, testing, and analysis of network protocols.

Special Network Projects - to research loosely coupled systems, network topology, and network ergonomics.

Network Architecture Program - to research and design network management and operations systems; protocols for broadcast, multi-cast, multi-homed, and multi-media systems, and study connectionless and connection-oriented services.

Desirable experiences include work in computer/communications, computer programming, artificial intelligence, compiler optimization, and technical committee work. An undergraduate degree which consisted of 30 semester hours in mathematics, statistics and computer science (including differential and integral calculus courses) is required in addition to at least three (3) years of experience in the computer science field. Positions are available for B.S., M.S., and Ph.D.'s in computer science or related fields.

Positions range from $30,549 to $65,642 depending upon qualifications and experience and offer excellent career benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
ATTN: Ms. Vicky Southers (Code: CW1115)
Administration Building, Room A-123
Gaithersburg, MD 20899

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland, and is an Equal Employment/Affirmative Action Employer. U.S. Citizenship is required.

SYSTEMS ANALYST

The Administrative Computing Center at the University of Vermont is seeking a Systems Analyst with a Bachelor's degree in a math or business related field. Applicants must have at least 5 years of data processing experience, 3 as a Systems Analyst. Experience in COBOL, IBM/DOS and online systems are required. Applicants with experience in higher education applications or DBMS are preferred. The candidate will be involved in the development and implementation of applications under our integrated database. Send resume and the names of 3 professional references by August 17 to: Patricia Urban, Director, Office of Administrative Computing, 238 Waterman Building, Burlington, VT 05405.

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Equal Opportunity Employer

MIS DIRECTOR

Ground floor opportunity in a 200 bed community hospital presently involved in the development of a Hospital-Wide Information System (HIS). Responsibilities include Long Range Systems Planning, hardware/software procurement and installation, significant interaction with all levels of end users, and departmental management. Current systems include a state-of-the-art microprocessor network and time-sharing financial applications. Implementation of a digital PBX is scheduled for early 1985.

If the opportunity to select, install and manage leading edge technology interests you and if you have a minimum of 5 years DP experience, preferably within the health care industry; please submit your resume and salary requirements to:

Juliana Desmarais
Personnel Representative
Mercy Hospital
144 State Street
Portland, ME 04101

SYSTEMS SOFTWARE PROGRAMMER
JOB #050676

Integrate CDC NOS Cray Station into a multi-computer network, maintain PDP-11 communications software, maintain other data communications software, other data communications duties as arranged. Must have experience with the internals of the NOS Cray Station, and with PDP-11 computers in a real-time communications environment. Must have strong technical proficiency with NOS 1.x, and RT-11. A BA/BS* in computer science or related field and 2 years experience applications or operating systems programming required. Salary $26,000 to $39,588/yr. *Equivalent or additional experience may be substituted for a degree.
Excellent fringe benefit package including tuition-free coursework.

Apply: **University of Minnesota**
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MANAGER
INFORMATION SYSTEMS

A challenging career opportunity at this 303 bed regional medical center located in a four season Great Lakes resort area. Application areas include all major financial systems as well as medical systems activities. Responsibilities include managing a staff of approximately ten people, all computer operations, setting facilities management direction, and other activities appropriate to the position and person. Requirements include a Bachelor's degree in systems or business (Master's preferred), health care and/or supervisory experience, and a proven record of achievement. Interested applicants should send a resume to:

Ms. Pat Webb
Munson Medical Center
6th and Elmwood
Traverse City, Michigan 49684

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SYSTEMS ANALYST

Min. 4 yrs. design/install of on-line IMS or CICS based projs. qualifies for CT corp. expanding distributed processing and fin'l. svcs. div. Full reloc. Salary to $34,000.

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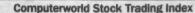
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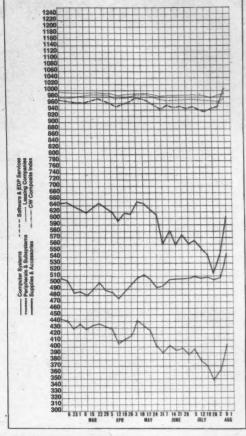
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Computerworld Stock Trading Index

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 8, 1984

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE AUG 8 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8- 24	11	+1 3/4	+18.9
O	ALTOS COMPUTER SYST	8- 21	11 1/4	+2 3/8	+26.7
A	AMDAHL CORP	10- 30	12 3/4	+2 1/4	+21.4
O	APPLE COMPUTER INC	18- 63	28 1/2	+3 1/2	+14.0
N	AT&T	15- 21	18 3/4	+7/8	+4.8
N	BURROUGHS CORP	44- 58	56 9/8	+2 3/4	+5.1
O	COMPUTER AUTOMATION	5- 17	8	0	0.0
N	COMPUTER CONSOLES	14- 28	16 5/8	+3 5/8	+24.1
N	CONTROL DATA CORP	29- 62	30	+3 1/4	+12.1
O	CONVERGENT TECHNOL	10- 41	14 1/8	+7/8	+6.6
N	CRAY RESEARCH INC	38- 58	53 1/8	+5 1/2	+11.5
N	DATA GENERAL CORP	27- 52	32 3/8	+5 7/8	+12.6
N	DATAPOINT CORP	18- 31	21 1/2	+2 1/8	+10.8
N	DIGITAL EQUIPMENT	64-125	80 7/8	+2 1/2	+2.8
A	EECO INC	12- 18	13 3/8	0	0.0
N	ELECTRONIC ASSOC.	3- 15	3 7/8	+7/8	+29.1
A	FLOATING POINT SYST	13- 44	17 3/4	+1 5/8	+10.0
N	FOXBORO	28- 47	30 3/4	+3 1/8	+11.3
O	GENERAL AUTOMATION	7- 18	9 5/8	+1 1/8	+10.0
N	GOULD INC	24- 44	30	+4 1/8	+15.9
N	HARRIS CORP	23- 48	30	+3 5/8	+13.7
N	HEWLETT-PACKARD CO	31- 48	41 1/4	+3 3/8	+8.9
N	HONEYWELL INC	48- 69	61 5/8	+6 1/4	+11.0
N	IBM	103-134	118 5/8	+3 3/4	+5.0
N	IPL SYSTEMS INC	3- 14	3	-3/8	-11.1
N	M/A-COM INC	13- 35	20 1/8	+1 3/8	+7.3
O	MANAGEMENT ASSIST	9- 37	26 5/8	+2 1/4	+9.2
N	MATSUSHITA ELEC(ADR)	80- 88	67 3/4	+3	+7.8
O	MODULAR COMPUTER SYS	8- 18	9	+1	+12.5
N	MOHAWK DATA SCI	9- 17	13 1/8	+ 7/8	+2.8
N	MOTOROLA INC	29- 42	39 5/8	+3 3/8	+8.3
N	NAT'L SEMICONDUCTOR	11- 20	14 5/8	+2 1/8	+17.0
N	NBI INC	17- 38	18 5/8	+3/8	+2.0
N	NCR	21- 34	26	+1 7/8	+7.7
N	PERKIN-ELMER	17- 28	18	+3	+20.8
N	PRIME COMPUTER INC	11- 28	18 3/4	+1 1/4	+6.0
N	SPERRY CORP	35- 50	38 1/2	+5 3/8	+1.8
N	TANDEM COMPUTERS INC	15- 40	16 1/8	+1 5/8	+11.2
N	TANO CORP	29- 62	29 3/4	+2 1/2	+8.1
N	TELEV.DEO SYSTEMS	4- 41	8 1/8	+1 3/4	+40.0
O	TELXON CORP	8- 16	11 7/8	+1 3/8	+13.0
N	TEXAS INSTRUMENTS	100-169	138 1/4	+13 3/8	+10.8
A	ULTIMATE CORP	15- 24	20 5/8	+5/8	+3.1
O	VECTOR GRAPHICS INC	1- 8	3 1/4	0	0.0
A	WANG LABS "B"	24- 42	28 5/8	+2 3/8	+8.0
A	WANG LABS "C"	24- 42	28 1/2	+2	+7.5
N	XEROX CORP	35- 52	37 1/8	+1 3/4	+4.9

LEASING COMPANIES

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
O	BOOTHE FINANCIAL CP	10- 21	21 1/4	+1 1/4	+6.2
N	COMDISCO INC	10- 42	12 7/8	+1 1/4	+10.7
N	CONTINENTAL INFO SYS	5- 16	8 1/2	+1 5/8	+33.3
N	DPF INC	10- 15	11 3/4	+1	+9.3
O	PHOENIX AMERICAN INC	8- 17	8 1/4	+3/4	+13.8
O	SELECTERM INC	11- 21	12	0	0.0
N	U.S. LEASING	24- 44	34 3/4	+4 3/4	+15.8

COMPONENTS

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
N	ADVANCED MICRO DEV	25- 37	34 5/8	+4	+13.0
O	ADV'D SEMICONDUCTOR	18- 38	23 1/2	+3 1/4	+16.0
N	ANALOG DEVICES INC	20- 32	23 1/4	+3 1/8	+16.0
O	ANALOGIC CORP	19- 31	11 1/4	+1/2	+4.6
N	APPLIED MAGNETICS CP	8- 37	10 5/8	+1	+10.3
N	TERADYNE	15- 37	23 3/8	+3 3/8	+17.0

SOFTWARE & EDP SERVICES

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
O	ADVANCED COMP TECH	3- 8	3 3/4	+ 1/2	+15.3
N	ADVANCED SYSTEMS INC	14- 22	17	+1/2	+3.0
O	AGS COMPUTERS INC	11- 32	13 3/4	+1/4	+1.8
N	AMERICAN SOFTWARE	13- 31	14 1/2	+1 3/4	+13.7
N	ANACOMP INC	2- 11	6 1/8	0	0.0
O	ANALYSTS INTL CORP	12- 19	5 3/4	+1/2	+9.0
O	APPLIED DATA RES.	18- 37	23 3/8	+4	+20.8
O	ASK COMPUTER SYSTEMS	13- 31	18 1/2	+1 7/8	+10.6
O	ASTRADYNE COMP IND	1- 7	2 1/8	0	0.0
N	AUTOMATIC DATA PROC	30- 44	37 3/8	+2 1/8	+6.0
O	CGA COMPUTER ASSOC	8- 17	12 1/8	-1/8	-1.0
O	COMPUTER ASSOC INT'L	15- 35	23 1/4	+5 1/2	+30.8
O	COMPUTER HORIZONS	8- 17	7	+1 1/2	+27.2
O	COMPUTER NETWORK	5- 11	5 1/4	0	0.0
N	COMPUTER SCIENCES	11- 23	14 1/8	+1 3/4	+14.1
O	COMPUTER TASK GROUP	12- 19	14 1/2	+1/4	+1.7
O	COMPUTER USAGE	6- 18	11 1/4	+3/8	+3.4
O	COMPUTONE SYSTEMS	4- 23	4 7/8	+1/4	+5.4
N	COMSERV CORP	1- 16	2 3/4	+1/4	+9.3
O	COMSHARE	7- 14	8	+1	+14.2
N	CULLINET SOFTWARE	24- 50	44 3/4	+7 1/2	+20.1
O	CYCARE SYSTEMS INC	16- 25	20	+1 1/2	+8.1
N	ELECTRONIC DATA SYST	25- 44	43 1/2	-3/8	-0.8
O	HOGAN SYSTEM INC	10- 27	12 1/2	+1 1/4	+11.1
N	GENERAL ELECTRIC CO	45- 59	56 3/4	+3 3/8	+6.3
N	GTE CORP	38- 48	39 3/4	+2	+5.3
O	INFORMATICS INC	15- 32	14 1/2	-1 3/8	-8.8
O	INFORMATION SCIENCE	1- 17	5	+1/4	+5.2
O	INFOTRON SYSTEMS CP	24- 43	31	+4 1/2	+16.9
O	KEANE ASSOCIATES	6- 15	10 1/2	+1	+10.5
O	LOGICON	18- 31	27	+3 1/2	+14.8
O	MCI COMMUNICATIONS	8- 28	7 1/2	+1/8	+1.6
O	MNGT SCI AMER INC	11- 33	12	+1/2	+4.3
O	MATHEMATICAL APP GRP	6- 18	8 1/2	-1/2	-7.1
O	MICOM SYSTEMS INC	31- 50	41	+5 1/4	+14.8
O	MONCHIK-WEBER CP	8- 25	9 7/8	+1/4	+4.3
O	NATIONAL DATA CORP	14- 26	16 3/4	+1/2	+3.5
O	ON-LINE SOFTWARE INT	8- 29	9 3/4	-1/4	-2.7
N	PANSOPHIC SYSTEMS	4- 23	4 7/8	+1 7/8	+14.1
N	PLANNING RESEARCH	12- 21	13	+1/4	+1.8
O	POLICY MGNT SYSTS CP	22- 35	27 1/2	+3/4	+2.8
O	PROGRAMMING & SYS	4- 8	5 1/4	+5/8	+13.5
N	REYNOLDS & REYNOLD	28- 53	34	+4	+13.3
O	REI CORP	13- 34	18 3/8	+2 3/8	+16.9
O	SHARED MEDICAL SYST	23- 43	24 1/4	-1 1/8	-4.3
O	SCIENTIFIC COMPUTERS	4- 14	8 1/4	+1/4	+3.2
O	SOFTWARE AG	8- 16	12	+1 1/2	+14.2
N	URS CORP	10- 18	11	+1 1/4	+12.8
N	UCCEL	7- 17	9 3/4	+1 1/2	+18.1

PERIPHERALS & SUBSYSTEMS

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
P	AM INTERNATIONAL	2- 7	2 7/8	+1/4	+9.5
A	ANDERSON JACOBSON	7- 26	8	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 28	12 5/8	+3	+31.1
O	AVANT-GARDE COMPUTING	19- 39	22 3/4	+3 1/4	+16.6
O	BANCTEC INC	6- 22	8 1/4	+7/8	+11.8
A	BEEHIVE INT'L	5- 16	5 1/8	-1/8	-2.3
N	BOLT,BERANEK & NEW	17- 30	21 3/8	+2 5/8	+14.0
O	CAMBEX CORP	7- 12	8 1/2	+1 1/4	+17.2
A	CENTRONICS DATA COMP	7- 12	8 1/2	+1 1/4	+17.2
A	CETEC CORP	7- 12	8 1/2	+1 1/4	+17.2
A	CODNITRONICS	4- 20	6	+1 5/8	+37.1

COMPUTER SYSTEMS (cont.)

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
O	COMPUTER DEVICES INC	1- 1	7/8	+1/8	+16.6
O	COMPUTER TRANSCEIVER	2- 10	1 3/4	0	0.0
N	COMPUTERVISION CORP	29- 53	43 1/8	+5 1/8	+13.4
N	COMPAC CORP	11- 24	14 1/4	-1/8	-0.8
A	DATAPRODUCTS CORP	18- 32	21 1/8	+3 3/4	+21.5
O	DATARAM CORP	12- 12	5 3/8	+1 3/8	-23.2
O	DATA SWITCH CORP	8- 41	8	+2 1/4	+38.1
O	ELECTRONIC H & M	5- 11	7 1/8	+7/8	+14.0
N	ENDATA, INC	8- 18	11 1/8	+1 3/8	+15.1
N	EVANS & SUTHERLAND	13- 50	15 1/2	+1 7/8	+10.8
O	GANDALF TECHNOLOGIES	9- 13	12 7/8	+2 1/4	+21.1
O	GEN'L DATA COMM IND	10- 18	18	+4	+20.5
O	GREAT SOUTHWEST IND	1- 3	1 1/2	0	0.0
N	HAZELTINE CORP	16- 31	26 3/4	0	0.0
A	ICOT CORP	5- 9	3 1/8	0	0.0
O	INFORMATION INTL INC	10- 18	10 1/4	-1/2	-4.6
O	INTEL CORP	27- 40	33 1/2	+2	+6.3
N	IPL SYSTEMS INC	3- 14	3	-3/8	-11.1
N	LUNDY ELECTRONICS	7- 18	8 3/4	+1 7/8	+27.2
O	MEGADATA CORP	10- 25	12	+3	+2.1
A	MSI DATA CORP	15- 25	10 1/2	+3/8	+3.7
O	NASHUA CORP	25- 38	33	+4	+16.6
N	NETWORK SYSTEMS CORP	16- 34	26 5/8	+3 3/8	+14.5
N	NO AMERICAN PHILIPS	30- 40	35 1/8	+1 3/8	+4.0
N	NORTHERN TELECOM LTD	30- 48	38 1/8	+3/8	+0.8
O	OMEX	1- 2	1	0	0.0
O	PARADYNE CORP	12- 26	14 3/4	+1 1/4	+8.2
A	PENRIL CORP	6- 14	13 1/2	+1	+8.0
N	PHOENIX AMERICAN INC	8- 17	8 1/4	+3/4	+13.8
N	PLESSEY CO (ADR)	23- 41	20	+2 3/4	+13.1
N	PRINTRONIX INC	18- 34	20	+3/4	+3.8
O	RANTEK CORP	6- 23	8 1/2	+1 1/4	+14.8
O	RECOGNITION EQUIP	10- 17	11 1/2	+7/8	+8.8
A	ROLM CORP	30- 60	46 3/4	+4 7/8	+11.6
O	SANDERS ASSOCIATES	38-120	48	+3 3/4	+8.4
O	SCAN DATA		3/8	0	0.0
O	SCAN-TRON CORP	9- 18	12	+2 3/4	+29.7
O	SCIENTIFIC ATLANTA	8- 23	8 1/2	+1 3/4	+18.9
O	STORAGE TECHNOLOGY	7- 23	8 5/8	+1 3/8	+18.9
N	SYKES DATATRONICS	2- 13	3 1/2	+1/2	+14.2
O	SYSTEMS & COMP TECH	20- 38	28	+3	+11.5
A	T BAR INC	7- 17	7 7/8	+1 1/8	+16.6
N	TAB PRODUCTS CO	12- 20	16 1/4	+1 7/8	+10.3
O	TANDON CORP	7- 35	11 1/8	+3	+38.9
A	TEC INC	6- 12	8 3/4	+1	-2.2
A	TEKTRONIX INC	50- 87	61 3/4	+4 1/2	-6.7
O	TELEX	19- 32	31 3/4	+2	+6.7
O	TESDATA SYSTEMS CP	9- 17	10 3/4	+3/4	+7.5
O	TIMEPLEX INC	13- 23	18 3/8	+2 7/8	+18.4
O	VISUAL TECHNOLOGY	9- 26	8 1/2	+1	+11.7

SUPPLIES & ACCESSORIES

EXCH		1983-84 RANGE	CLOSE	WEEK NET	WEEK PCT
N	AMERICAN BUS PROD	17- 22	22	+1	+4.7
A	BARRY WRIGHT	22- 33	30	+2 3/4	+10.0
O	DUPLEX PRODUCTS INC	22- 38	26	+1 5/8	+2.6
N	ENNIS BUS. FORMS	18- 26	21 1/2	+1 3/8	+8.3
N	3M COMPANY	68- 90	81 5/8	+4 7/8	+6.3
O	MOORE CORP LTD	25- 31	31 1/4	+1 1/8	+5.4
O	STANDARD REGISTER	27- 37	33	+1 7/8	+6.4
N	WALLACE COMP SERVICE	23- 33	29 1/4	+2 5/8	+9.8

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; H=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR